

# **Best Management Practices for Delaware Boat Maintenance Facilities**



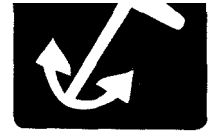
**Department of Natural Resources and Environmental Control  
May, 1997**

## Acknowledgments

Thank you to the following people for their contributions to this document:

- David Liebel and the University of Wisconsin - Extension Solid and Hazardous Waste Education Center, for permission to excerpt their best management practices for this manual
- Michael Dukes for the preparation of the document
- Laura Herr and Chuck Schadel of the Delaware Department of Natural Resources and Environmental Control for providing comments and guidance
- Steve Beaston of LMB Enterprises for providing input and comments

# Why Best Management Practices?



All Delaware businesses abide by certain environmental regulations in their daily operations. Boat maintenance facilities (which may include marinas); however, have a special responsibility because their normal operations bring them in contact with Delaware's waterways. This relationship requires a high level of commitment and attention to preserve the quality of these resources. This document presents Best Management Practices (BMPs) targeted at boat maintenance facility managers so that they can continue to serve the needs of boaters while protecting the important aquatic resources upon which they depend.

## Background

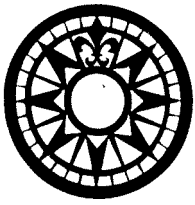
Boat maintenance facilities play an important role in the Delaware economy. They provide services for recreational boaters, commercial fishermen, and sport fishermen. The close interaction of boat maintenance facility patrons with the environment results in a greater likelihood of producing adverse environmental impacts. Specifically, the close proximity of these facilities to surface waters, precludes any buffering of wastes, and may result in non-point source pollution of surface waters. Non-point source pollution occurs when rain water runoff collects pollutants as it washes over exposed surfaces, thus acting as a transport mechanism by carrying those pollutants into the water. Control, detention and/or filtering of rainwater runoff and reduced exposure of pollutants to rainwater can therefore have significant surface water quality benefits. This unique situation means that a "small polluter" may have a relatively large impact on the marine environment. The following list gives a few general categories of possible pollutants from boat operation and maintenance facilities:

### \* Biological Oxygen Demand (BOD)

This is a measure of the amount of dissolved oxygen used to degrade organic waste by naturally occurring micro-organisms. Organic waste may come from sewer discharges or any other organic source (improper disposal of sewage from boats or fish cleaning waste for example). Wastes with a high BOD will deplete the dissolved oxygen in a waterbody; thereby, killing organisms requiring oxygen.

### \* Metals

Metals may come from a variety of sources but at boat maintenance facilities, they are most commonly linked to the removal of antifouling bottom paints. Elevated levels of copper, lead, zinc, mercury, arsenic, nickel, chromium, cadmium, and butyltins have been found to be associated with boat operations and maintenance. Metals are toxic to many forms of marine life and also have been found to increase up the food chain (i.e. bio-magnify), which may cause toxicity in humans that consume contaminated marine organisms.



## ☼ Petroleum Hydrocarbons

Petroleum hydrocarbons are associated with petroleum products such as fuel and oil. These compounds may accumulate in bottom sediments and pose a toxic risk to marine life. Sources include fueling operations, stormwater runoff, bilge waters, and normal engine operation.

## ☼ Suspended Solids

Suspended solids are small particles that remain suspended in the water column. These solids decrease water quality by providing surfaces for toxic materials such as metals to attach. Since suspended solids are too small to settle to the bottom, they create a “cloudy” or “murky” body of water. Suspended solids may come from many potential sources, including stormwater runoff of parking lots or boat maintenance areas.

Clearly these pollutants pose a direct threat to water resources and in some cases may impact human health. One way to avoid these impacts is to utilize BMPs at boat operation and maintenance facilities.

The goal of this document is to help boat maintenance facility operators and owners to assess their facility and increase awareness of BMPs.

## Environmental Regulation

In Delaware, responsibility for establishing and enforcing environmental regulations lies primarily with the Delaware Department of Natural Resources and Environmental Control (DNREC). Several types of pollution pertaining to boat maintenance facilities are regulated by DNREC, including the following: boat maintenance facility construction and operation, hazardous and solid waste storage, treatment and disposal, wastewater discharge, underground storage tanks (USTs) installation and operation, and management of stormwater runoff.

Following is a list of regulations pertaining to boat maintenance facilities along with the telephone numbers at DNREC where further information can be obtained. Appendix A also gives more contact information.

### \* Marina Regulations

Wetlands and Subaqueous Lands Section (302) 739-4691

### \* Regulations Governing Hazardous Waste

Hazardous Waste Management Branch (302) 739-3689

### \* Regulations Governing Solid Waste

Solid Waste Management Branch (302) 739-3820

### \* Regulations Governing the Control of Water Pollution

Surface Water Discharge Section (302) 739-5731

### \* Regulations Governing Underground Storage Tanks

Underground Storage Tank Section (302) 323-4588

\* Regulations Governing Stormwater Discharges Associated with industrial Activity  
Surface Water Discharge Section (302) 739-5731



\* Delaware Surface Water Quality Standards  
Watershed Assessment Section (302) 739-4590

## Pollution Prevention

Pollution prevention is defined as any act that reduces the generation or toxicity of pollutants and wastes at the source. Pollution prevention methods include but are not limited to the following: material substitution, changes in operations or procedures, in-process recycling, off-site recycling, product or service change, or equipment modification. Examples of each of these methods could be the following: using a less toxic paint (e.g., water based instead of solvent based), storing chemicals under cover on impervious surfaces, using biodegradable antifreeze, and using “dustless” sanders that capture sanding particles. Pollution prevention commonly saves businesses money, while protecting the environment. Pollution prevention has successfully been implemented by businesses in Delaware as diverse as metal fabricators, food processors, dry cleaners, auto shops, and chemical companies. The Pollution Prevention Program at DNREC can provide further information and assistance (the Pollution Prevention Program can be contacted at 739-3822).

## Recycling

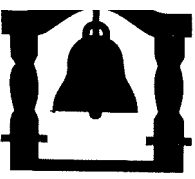
Recycling is generally considered separately from pollution prevention since recycling does not necessarily prevent pollution generation. However, recycling materials is preferred over disposal. Similar to pollution prevention, recycling often saves money, while protecting the environment. Examples of recycling would be the reuse of plumbing antifreeze and vendor recycling (i.e. scrap metal, waste oil, and batteries). Appendix A gives recycling contact information.

## Best Management Practices

Best Management Practices (BMPs) are defined by Delaware’s Marina Regulations\* as the following: Methods, measures, or practices that are determined by DNREC to be a reasonable and cost-effective means for a person to meet certain pollution control needs. BMPs include, but are not limited to, structural and non-structural controls and operation and maintenance procedures. BMPs can be applied before, during, or after pollution producing activities to reduce or eliminate the introduction of pollutants into receiving waters. Many BMPs are essentially methods that accomplish pollution prevention or recycling.

The next two sections will outline BMPs targeted at boat operation and maintenance facility operations and at materials commonly found at boat operation and maintenance facilities.

\*For copies of Delaware’s Marina Regulations call the Wetlands and Subaqueous Lands Section of DNREC at (302) 739-4691.



# Best Management Practices for Operations

The following waste management and pollution prevention best management practices for boat maintenance facilities are described for common boat yard activities. The types of boat maintenance facilities that they apply to include:

- ✓ Recreational boat docking facilities
- ✓ Commercial boat docking facilities
- ✓ Boat storage facilities
- ✓ Boat building and maintenance facilities

It should be noted that boat maintenance facility operators may be held responsible for the pollution caused by boat owners who perform maintenance activities on facility property. Therefore, an important component of BMP implementation should include provision of appropriate guidance and materials to boat owners to help them utilize environmentally sound products and practices.

These best management practices are meant to guide the boat maintenance facility operator in meeting or exceeding their regulatory responsibilities but are not a substitute for existing regulations. Any questions about specific regulations and compliance responsibilities should be directed to the appropriate division at DNREC.

This section presents BMPs aimed at facility operations.

## Wastewater Discharge

Most non-domestic wastewaters generated by boat maintenance facility operators are considered industrial wastewater. Non-domestic wastewater, industrial wastewater, or other wastewater should not be discharged into any sewer designated-to carry stormwater or allowed to flow directly into surface waters. No industrial wastewater, or other liquids should be discharged to sanitary sewers without prior approval from the Publicly Owned Treatment Works (POTW) operator.

## Stormwater Runoff

The DNREC stormwater discharge control program controls pollutant discharges to water courses caused by runoff from businesses. Boat maintenance facilities are required to obtain a stormwater permit and develop a stormwater pollution prevention plan. The permit application must identify the type of operations taking place at the facility and describe, the flow of stormwater on the facility grounds. For more information on applying for a stormwater discharge permit contact DNREC at (302) 739-5731.

## Material Storage and Handling

Liquid wastes should not be discharged into a storm sewer, sanitary sewer or onto the open ground or surface waters unless permitted. Care should be taken in handling these products and spills

☸ **Regulations Governing Stormwater Discharges Associated with Industrial Activity**  
Surface Water Discharge Section (302) 739-5731

☸ **Delaware Surface Water Quality Standards**  
Watershed Assessment Section (302) 739-4590



## Pollution Prevention

Pollution prevention is defined as any act that reduces the generation or toxicity of pollutants and wastes at the source. Pollution prevention methods include but are not limited to the following: material substitution, changes in operations or procedures, in-process recycling, off-site recycling, product or service change, or equipment modification. Examples of each of these methods could be the following: using a less toxic paint (e.g., water based instead of solvent based), storing chemicals under cover on impervious surfaces, using biodegradable antifreeze, and using “dustless” sanders that capture sanding particles. Pollution prevention commonly saves businesses money, while protecting the environment. Pollution prevention has successfully been implemented by businesses in Delaware as diverse as metal fabricators, food processors, dry cleaners, auto shops, and chemical companies. The Pollution Prevention Program at DNREC can provide further information and assistance (the Pollution Prevention Program can be contacted at 739-3822).

## Recycling

Recycling is generally considered separately from pollution prevention since recycling does not necessarily prevent pollution generation. However, recycling materials is preferred over disposal. Similar to pollution prevention, recycling often saves money, while protecting the environment. Examples of recycling would be the reuse of plumbing antifreeze and vendor recycling (i.e. scrap metal, waste oil, and batteries). Appendix A gives recycling contact information.

## Best Management Practices

Best Management Practices (BMPs) are defined by Delaware’s Marina Regulations\* as the following: Methods, measures, or practices that are determined by DNREC to be a reasonable and cost-effective means for a person to meet certain pollution control needs. BMPs include, but are not limited to, structural and non-structural controls and operation and maintenance procedures. BMPs can be applied before, during, or after pollution producing activities to reduce or eliminate the introduction of pollutants into receiving waters. Many BMPs are essentially methods that accomplish pollution prevention or recycling.

The next two sections will outline BMPs targeted at boat operation and maintenance facility operations and at materials commonly found at boat operation and maintenance facilities.

\*For copies of Delaware’s Marina Regulations call the Wetlands and Subaqueous Lands Section of DNREC at (302) 739-4691.





wastewater may be recycled or disposed of, but prior to disposal, it should be treated so as to reduce the levels of concentrations of heavy metals (principally copper) and meet the standards for disposal in sanitary sewers as set by the POTW operator. This wastewater may not be discharged to surface waters or storm sewers and paint solids should be separated from the wastewater and disposed of properly.

Removing bottom paint by wet or dry sanding (either by hand or with power tools) produces a sanding dust containing potentially hazardous metals (principally copper). This sanding should be done over an impervious surface such as asphalt, cement, or a material such as canvas, plastic, etc. (not over open ground) and there should be a berm or retaining wall surrounding the area so that the sanding dust can be swept or vacuumed and disposed of properly. Whenever possible vacuum sanding systems should be used to collect sanding dust as it is created. Dust should not be allowed to become wind-borne or otherwise leave the containment area.

## Sanding Hulls or Topsides

The sanding dust generated by this activity should be collected and disposed of properly and may not be intentionally discharged into a storm sewer or onto surface waters. Where sanding is conducted on land, reasonable precautions should include laying drop cloths beneath the area being sanded and collecting the debris for proper disposal. Where sanding is conducted in the water, reasonable precautions should include covering the water near the boat with floating traps or surrounding the immediate area with floating booms and removing the debris with a skimmer.

## Spray Painting

Wastes related to spray painting are often a major source of environmental pollution. Several steps can be taken to reduce waste and emissions from painting operations: carefully control inventory so that waste paint and solvents are kept to a minimum; store waste paint, solvents, and rags in covered containers to prevent evaporation to the atmosphere; direct solvent from cleaning spray equipment into containers to prevent evaporation to the atmosphere; whenever possible use solvents with low volatility and coatings with low Volatile Organic Compound (VOC) content; use high transfer efficiency coating techniques such as brushing and rolling to reduce overspray and solvent emissions. Spray painting on land should occur over an impermeable surface and in such a manner that overspray does not fall on open ground or surface waters.

## Engine and Parts Storage

Engines and engine parts should be stored on an impervious surface such as sealed asphalt or cement, and covered to avoid contact with stormwater. Care should be taken to prevent oil and grease from leaking onto the open ground.

## Engine Parts Washing

Washing engine parts with solvent is not permitted over open ground. Parts washing should be done in a container or parts washer with a lid to prevent evaporation. The parts should be rinsed or air dried over the parts cleaning container. The dirty parts washing fluid should be recycled or disposed

of by a licensed waste hauler. Water soluble engine washing fluids should be treated in the same manner as other industrial wastewaters.

## Pressure Cleaning

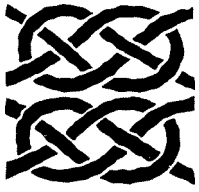
The use of pressure cleaning equipment for the initial rinse-off of a vessel hauled from the water generates industrial wastewater. This process should be restricted to an area with an impermeable surface (such as sealed asphalt or sealed concrete) and with a dike or pitch which allows the wastewater to be collected and directed into a tank or other containment device. Wastewater from pressure cleaning may not be discharged to septic tanks or surface waters. Wastewater may be disposed by sanitary sewer disposal. Tanks used to collect wastewater and remove solids are considered process tanks and paint solids classified as hazardous must be separated and removed by a licensed hauler. A list of vendors of pressure wash recovery systems can be obtained from the Pollution Prevention Program at (302) 739-3822.

## Steam Cleaning

Steam cleaning should be done on an impervious area designed to collect and contain the cleaning effluent. Discharges to surface waters are prohibited. If detergents or solvents are not used, a properly sized grease trap/oil and water separator connected to a sanitary sewer and properly maintained, should provide adequate treatment to allow the effluent to meet sewer standards.

If detergents or solvents are used, the oil and grease are emulsified and a grease trap will not function properly. In these cases, treatment or recycling systems should be used. This water should be considered industrial wastewater and discharge to septic systems or storm sewers is prohibited. If sanitary sewers are not available, wastewater should be hauled by a licensed hauler.





# Best Management Practices for Materials

RMPs for materials are presented in this section. These BMPs are typically “low tech” and often cost effective ways of reducing waste streams. (BMP graphics contained in Appendix B)

## Antifreeze

Antifreeze, when drained from an engine, should be stored in a clearly marked container on an impervious surface and under cover. Reuse and recycling of antifreeze should be done whenever possible (e.g. as freeze protection for bilges or plumbing). Antifreeze cannot be disposed of down a storm drain or in a septic system. Disposal to a sewer connected to a POTW must be allowed by the POTW operator, otherwise it should be removed from the site by a waste transporter permitted to handle this waste. The Hazardous Waste Management Branch at (302) 739-3689 maintains a list of ‘approved transporters.

## Used Lead-Acid Batteries

These should be stored on an impervious surface, stored under cover, protected from freezing and picked up by an approved transporter for recycle. The Hazardous Waste Management Branch maintains a list of approved transporters.

## New Oil

This includes new engine oil, transmission fluid, hydraulic oil, and gear oil. These petroleum products should be kept in non-leaking containers on an impermeable surface and covered in a manner that will prevent stormwater from contacting the container. Leaking containers should be emptied promptly upon detection, either by transferring the product to a non-leaking container or by disposing of it in the “used oil” container.

## Used Oil

This includes waste engine oil, transmission fluid, hydraulic oil, and gear oil. Used oil should be stored in a clearly marked non-leaking container on an impermeable surface, and covered in a manner that will prevent stormwater from contacting the container. Oil spills should be prevented from leaving the area by means of a berm or retaining structure. Used oil should be removed from the site by a permitted transporter or used in an approved and permitted oil heater on-site. Contact the Hazardous Waste Branch for a list of approved used oil transporters. Contact the Air Quality Management Section at (302) 323-4542 for permitting information on waste oil heaters.

## Oil or Fuel Filters

Oil or fuel filters should be crushed or punctured and hot-drained by placing the filter in a funnel over the appropriate waste collection container to allow the excess petroleum product to drain into

the container. Drained filters should be collected and recycled when possible. Only filters that have been crushed or hot-drained to remove all excess oil can be disposed of as solid waste.



## Mercury Lamps and Switches

Spent fluorescent bulbs, other mercury lamps and mercury switches are hazardous waste. Delaware provides an exemption for fluorescent and mercury lamps that are recycled. Spent lamps should be collected and stored safe from breakage until a sufficient quantity has accumulated for recycling.

## Fiber Reinforced Plastic

Use of epoxy and polyester resins for repair or construction of boat hulls can generate significant amounts of waste. Common solvents such as acetone or methylene chloride evaporate easily and should be kept in covered containers. Small amounts of unused resins may be catalyzed prior to disposal as solid waste. However, catalyzation is not an acceptable method of disposing of outdated or unneeded resin stores. These materials must be treated as hazardous waste and disposed of by a licensed waste hauler.

## Glue and Adhesives

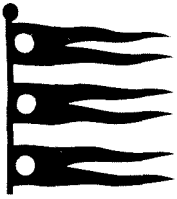
Residual amounts of glues and adhesives remaining in empty caulking tubes may be disposed of as solid waste. All other glue and adhesive related wastes must undergo a determination for hazardous waste characteristics. Nonhazardous glues and adhesives in liquid form cannot be disposed of as solid waste, and should be used for their originally intended purpose.

## Paints, Waste Diesel, Kerosene and Mineral Spirits

These products should be stored in non-leaking containers on an impermeable surface, and covered to prevent stormwater from contacting the container. Each container should be clearly labeled with its contents and storage locations should conform to local Fire Codes. The disposal of any waste products from these materials should be performed by a licensed waste transporter. A list is available from the Hazardous Waste Management Branch at (302) 739-3689. These waste products should not be allowed to evaporate; poured on the ground; disposed of in storm sewers, septic systems or POTWs; or discharged to surface waters.

## Waste Gasoline

Waste gasoline should be stored in a non-leaking container, on an impermeable surface and covered to prevent stormwater from contacting the container. The container should be clearly labeled "waste gasoline" and the storage location should conform to local Fire Codes. Whenever possible, waste gasoline should be filtered and used as a fuel. Waste gasoline should not be allowed to evaporate; poured on the ground; disposed of in storm sewers, septic systems or POTWs; or discharged to surface waters. Waste gasoline should be removed from the site by a licensed waste transporter. For more information, call the Hazardous Waste Management Branch at (302) 739-3689.



# Boat Maintenance Facility Self-Assessment Checklist

This checklist is provided to assist operators in conducting a site assessment at their boat maintenance facility. General categories are outlined below with brief descriptions. Checklist users should be familiar with BMPs and regulations that apply to boat maintenance facilities.

✓	General Operations	Yes	No
	Employee training Program (Is there a recurring employee training program for all aspects of operations?)		
	Awareness of Regulations Do the employees show a good understanding of the regulations? Are boat owners aware of the applicable environmental regulations?)		
	Tracking of Waste and Emissions Is there awareness of permit requirements and are records kept of waste and emissions?)		
	Customer Agreements and Education (Does the management make use of contracts with boat owners to enforce good environmental behavior?)		
	Good Signage (Are BMPs described and posted so that employees and users will observe them? For example, a sign near the pumpout station forbidding waste discharge in the inland waterways.)		
✓	Office Operations		
	Solid Waste Recycling (Are white paper and corrugated cardboard recycled? What about aluminum cans?)		
	Cost Accounting for Environmental (Are regulatory and other environmental costs fully accounted for in the operation of the facility? Costs such as spill containment apparatus or waste oil pickup.)		



✓	Wastewater Discharge	Yes	No
	Sewered or Septic System (Are power washing waters and spills captured for proper disposal [i.e., to the sewer or to a waste transporter]? Power wash water should not be sent to a septic system.)		
	Fish Cleaning Stations (Are they provided and do they drain to the sewer?)		
	Floor Drains (What could drain into them and where do they lead?)		
✓	Stormwater Runoff		
	Permit (Has one been obtained? This will be mandatory in the next few years.)		
	Stormwater Flow Map (Is there one for the site and does it identify problem areas?)		
	Surface Flow Control (What has been done to prevent runoff to water bodies [i.e., containment ponds, berms or wales?])		
	Outdoor Equipment Storage (Can stormwater become contaminated through contact with equipment?)		
	Outdoor Equipment Maintenance Operations (What maintenance operations could contaminate stormwater? These operations could include power washing, engine maintenance, sanding, parts storage, etc.)		
✓	Fueling Operations		
	Employee and Customer Raining & Supervision (What is the policy; does the customer or an employee fuel the boat?)		
	Adequate Facilities (Are pumps and nozzles in good condition? Will the docking arrangement help prevent spills?)		
	Spill Containment (Is containment equipment available and ready for use?)		
I	Underground Storage Tanks/Aboveground Storage Tanks (Are they periodically being tested or checked for leaks from the tank(s) or piping? Are spills during deliveries a problem?)		



✓	Pumpout Operations	Yes	No
	Pumping Station (Do employees <b>perform</b> pumpout?)		
	Vessel Y-Valves (Are bilge Y-valves wired shut while in inland waters?)		
	Boater Education (Are there incentives to promote pumpout? Are boaters educated about pumpout procedures?)		
✓	Boater Maintenance		
	Bottom Paint Removal (Are chemical paint strippers used or is the paint sanded off? What type of containment is used for removal operations and how is any waste production disposed of?)		
	Sanding Hulls or Topsides (Is there a provision for the collection of sanding residue? Sanding should not be performed over water.)		
	Spray Painting (Are there paint booths with filters? Are there permits? How is cleanup of the area handled and how is any waste production disposed of?)		
	Fiber Reinforced Plastic (Are solvents stored in covered containers? Where are uncured resins stored? Disposal of fiberglass waste?)		
	Engine Parts Washing (Is this wastewater sent to a POTW or a waste transporter/recycler?)		
	Pressure Cleaning (How is this wastewater handled?)		
✓	Materials Storage, Handling and Disposal		
	Hazardous Material Storage (Does storage meet hazardous material requirements, such as correct labeling, impervious surface, and under cover?)		
	Spill Control Plan (Is there one? Do employees know it? Are containment materials available for immediate use?)		
	Antifreeze (Is this recycled?)		

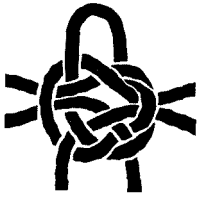


✓	Materials Storage, Handling and Disposal (cont.)	Yes	No
	Used Lead-Acid Batteries (Are these safely stored? Are these recycled?)		
	New Oil ( <b>IS</b> this stored properly and is it dispensed with a minimum chance of spillage?)		
	Used Oil, Waste Diesel, Kerosene and Mineral Spirits (AR these recycled? If not, how is disposal handled?)		
	Oil and Fuel Filters (AR these drained and disposed of properly?)		
	Mercury Lamps and Switches (Are these recycled? If not, how is disposal handled?)		
	Glue and Adhesives (Are these disposed of properly?)		
	Paints (Are these disposed of properly or stored in covered containers if not fully used?)		
	Waste Gasoline (Is this recycled? If not how is it disposed of?)		



Any “no” answers indicate that some type of action needs to be taken. Information on that action may be obtained from this document or from one of the contacts listed (see Appendix A).





# Appendix A: Contact Information

## Pollution Prevention Program

For more information regarding pollution prevention opportunities and BMPs for boat operation and maintenance facilities, contact the Pollution Prevention Program at (302) 739-3822.

## Anti-Fouling Paints

Anti-fouling paints are regulated by the Delaware Department of Agriculture due to their similarity to pesticides. The Department of Agriculture grants permits to businesses for safe paint application and handling. For more information contact (302) 739-4811.

## Wetlands and Subaqueous Lands

Since boat operation and maintenance facilities are often in close proximity to wetlands and underwater lands, the Wetlands and Subaqueous Lands Section at DNREC ensures that they comply with the Delaware Marina Regulations, Wetlands Regulations, and Regulations Governing the Use of Subaqueous Lands. For more information or a copy of specific regulations contact the Wetlands and Subaqueous Lands Section at (302) 739-4691.

## Hazardous Waste Management

You are encouraged to contact the Hazardous Waste Management Branch of DNREC if you have a question about hazardous waste management such as disposal, transport, and recycling. The Hazardous Waste Branch can be reached at (302) 739-3689.

## Used Oil Recycling

Used oil is any oil refined from crude oil or synthetic oil that becomes contaminated during use. It includes engine oil, gear oil, grease, lubricating oil, cutting oil, transformer fluids and tempering or quenching oils. Used oil is generated from home and commercial use. Almost any business or public agency that maintains heavy equipment and machinery, or a fleet of vehicles, produces used oil. Delaware regulations prohibit disposal of all used oil in landfills. In Delaware, used oil is regulated as a nonhazardous solid waste unless it displays a hazardous characteristic or mixed with a listed hazardous waste.

The Hazardous Waste Management Branch at DNREC can be contacted for information regarding used oil recycling including a list of approved transporters at (302) 739-3689.

## Municipal Wastewater

The municipal wastewater program is responsible for dealing with any publicly or privately owned wastewater treatment.

The following is what you should keep in mind when deciding if your facility will need a municipal wastewater permit:

Does the project include facilities, other than a septic system for the treatment and disposal of

domestic wastewaters? If the answer to this question is “yes”, then:

- ✓ You must apply for a National Pollutant Discharge Elimination System permit (NPDES).
- ✓ You must file plans and specifications for the treatment facilities.
- ✓ A certified operator must be employed to run the facility. The owner does not need this certification, but the plant operator does.



Contact the Surface Water Discharges Section of DNREC at (302) 739-5731 about the Municipal Wastewater Program.

## Stormwater Program

The Delaware stormwater discharge control program has been implemented in accordance with recent federal regulations. The purpose of this program is to control and reduce pollutants in stormwater runoff which are carried to our lakes, streams, and groundwater. These permits will typically require management practices which minimize contact of stormwater with potential pollutant sources. (BMP graphics contained in Appendix B)

For more information contact the stormwater program at (302) 739-5731.

## Delaware’s Recycling Program

Contacts about recycling in Delaware are the following:

Delaware Economic Development Office:	(302) 739-4271
DNREC Solid Waste Management Branch:	(302) 739-3820
Recycle Delaware, Delaware Solid Waste Authority:	(302) 577-3457

## Underground Storage Tanks

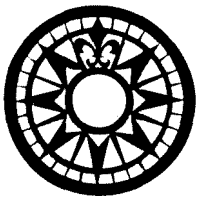
Underground storage tanks (USTs) containing fuels and other hazardous substances are regulated by the UST Branch at DNREC. Regulations require operating UST systems to be registered, checked for leaks, protected from corrosion, and reported to DNREC if suspected to be leaking. Contractors performing UST installations, removal/abandonment, retrofit/upgrade, or internal lining must be Delaware certified. Replacing existing underground storage tanks with above ground tanks may be a prudent approach to managing potential legal liability caused by leaking underground tanks. For more information on underground tank regulations contact the UST Section at (302) 323-4588.

## OSHA

The Occupational Safety and Health Administration regulates work place safety standards including employee hazardous materials education and right to-know requirements. A complete file of Material Safety Data Sheets (MSDS) for all chemicals used in the work place must be kept up-to-date in a readily accessible location for employee use. All employees must also be trained in safe handling procedures for hazardous materials. The Delaware Department of Labor OSHA section can be reached at (302) 761-8200.

## Emergency Numbers

DNREC emergency response number: (302) 739-5072 or 1-800-662-8802



# Appendix B: Guidance and Diagrams

## Background

Boat maintenance and fueling operations can have significant impacts on the concentrations of pollutants in the water column and bottom sediments (EPA, 1993). The organic, in sewage and bilge water discharged from boats can deplete the dissolved oxygen (DO) which is required for sustaining much aquatic life. Metals have many functions in boat operation, maintenance and repair. Lead is used as a fuel additive (EPA, 1991). Arsenic and chromium are used in paint, pesticides and wood preservatives. Zinc anodes are used to deter corrosion on metal hulls and engine parts. Copper and tin are used as biocides in antifoulant paints. Dissolved copper was detected at toxic concentrations at several marinas within the Chesapeake Bay (Hall et. al., 1987) and has been detected in the sediments of Delaware's coastal bays (Versar, 1995).

Solid waste (e.g. wrappers, containers) can cause aesthetic as well as physical dangers to both aquatic and terrestrial wildlife. Fish waste from fishing operations (commercial or private) can negatively impact water quality by depleting dissolved oxygen levels. The amount of fish waste disposed into the small, often poorly flushed areas such as marina basins can exacerbate the impact. (EPA 1993);

Tributyl Tin (TBT) an organo-tin compound, displays high toxicity to aquatic organisms (Hall Jr., L.W.; Pinkney, A.E., 1985). Scientists noted a significant increase in oyster production and a dramatic decrease in shell deformation after levels of organotin were significantly reduced in waters containing shellfish beds (Huggett, R.J., et al, 1992). Tin compound-related toxicity can be exhibited at levels as low as a few parts-per-billion to parts-per-trillion (Huggett, R.J., et al, 1992; and Bushong, S.J., et al, 1990).

Table 09-A (Potential Pollutants and Impacts Associated with Storm Water Discharges from Marinas)

Pollutant Category	Sources	Environmental impacts
Metals and Metal containing Compounds	<ul style="list-style-type: none"> <li>• Incomplete fuel combustion</li> <li>• Boat bilge discharges</li> <li>• Boat construction</li> <li>• Paint, wood preservatives, cleaners</li> </ul>	<ul style="list-style-type: none"> <li>• Lethal and/or sublethal toxicity in water column</li> <li>• Lethal and/or sublethal toxicity in bottom sediments</li> </ul>
Petroleum Hydrocarbons	<ul style="list-style-type: none"> <li>• Refueling activities</li> <li>• Bilge or fuel discharge</li> </ul>	<ul style="list-style-type: none"> <li>• Lethal and/or sublethal toxicity in water column</li> <li>• Lethal and/or sublethal toxicity in bottom sediments</li> </ul>
Sediments	<ul style="list-style-type: none"> <li>• Parking lots, work area, erosion</li> </ul>	<ul style="list-style-type: none"> <li>• turbidity which restricts light</li> <li>• Smothering of bottom habitat</li> <li>• Silts can cause behavioral restrictions</li> </ul>
Sewage	<ul style="list-style-type: none"> <li>• Bilge Drippings</li> </ul>	<ul style="list-style-type: none"> <li>• Reduces dissolved oxygen</li> <li>• Pathogen threat to shellfish harvesting</li> </ul>



## Coverage ( p 9.1091)

This part applies to SIC code 4493 - Marinas and Boat Maintenance

These establishments rent boat slips and store boats and generally perform a range of other services including cleaning and incidental boat repair. They frequently sell food, fuel, fishing supplies and boats.

This part also applies to SIC code 4499 - Water Transportation Services

Only establishments which perform maintenance or repair on boats, ships or other watercraft.

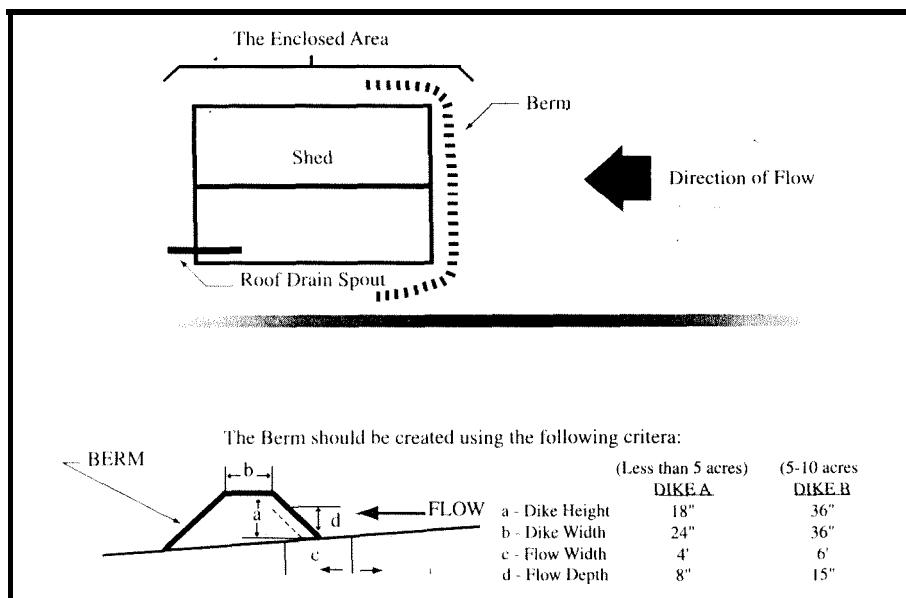
## Example of an Enclosed Area

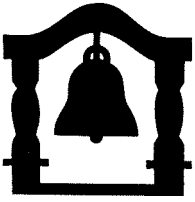
The walls and roof of the enclosed area can be as simple as a shed of plywood, plastic sheeting or metal. However, the structure must be sturdy, dependable and leakproof. The floor can consist of concrete, asphalt, a poly-synthetic liner or a layer of clay.

Concrete and Asphalt - must be laid in order to be impervious and prevent cracking;

Synthetic Liners - [Recommended specifications: Thickness at least 30 mil], a geo-textile fabric should be placed on the liner [Recommended specifications: Puncture Strength - 135 to 150], followed by several inches of washed pea gravel to stabilize the liner.

Clay Layers - [Recommended specifications: Thickness - 6 inches] should be followed by a geo-textile fabric should be placed on the liner [Recommended specifications: Puncture Strength - 135 to 1501, then by several inches of organic earth, then by several inches of washed pea gravel. The shed must have a roof that does not leak, is sturdy and dependable. The roof drains should discharge outside the bermed area.





## Example of an Enclosed Area

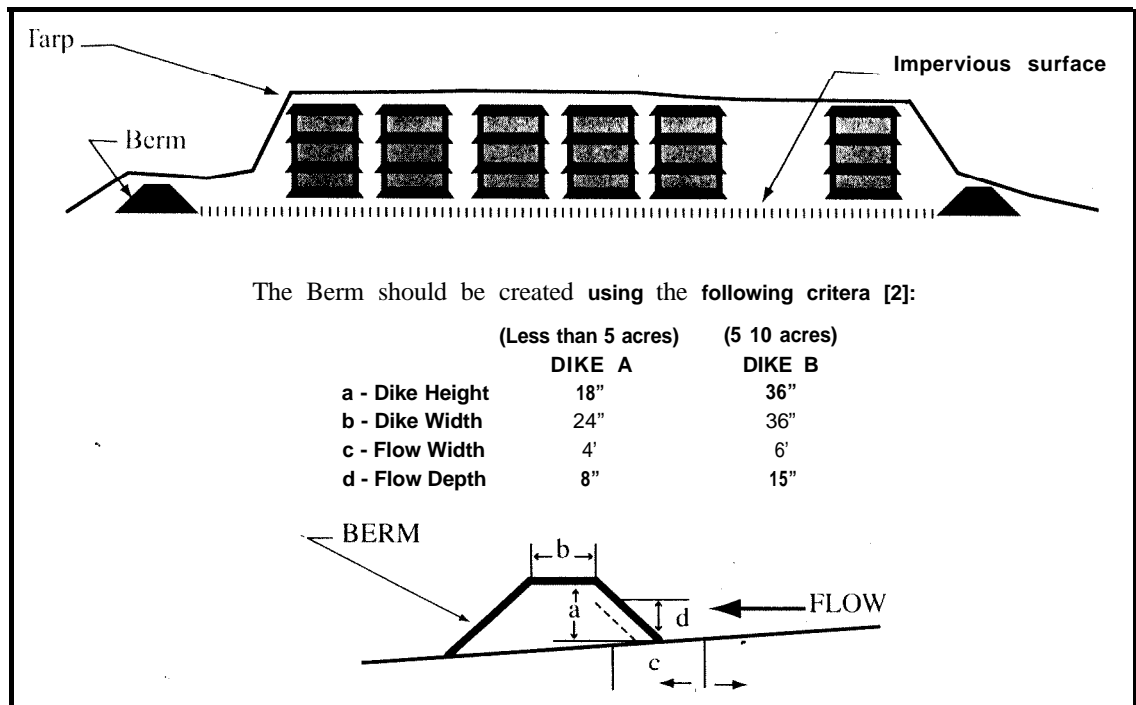
An impervious floor should be established which conforms to the following guidelines (an impervious flooring is not necessary for sand piles ).

Concrete and Asphalt - must be laid in order to be impervious and prevent cracking;

Synthetic Liners - [Recommended specifications: Thickness at least 30 mil], a geo-textile fabric should be placed on the liner [Recommended specifications: Puncture Strength - 135 to 150], followed by several inches of washed pea gravel to stabilize the liner.

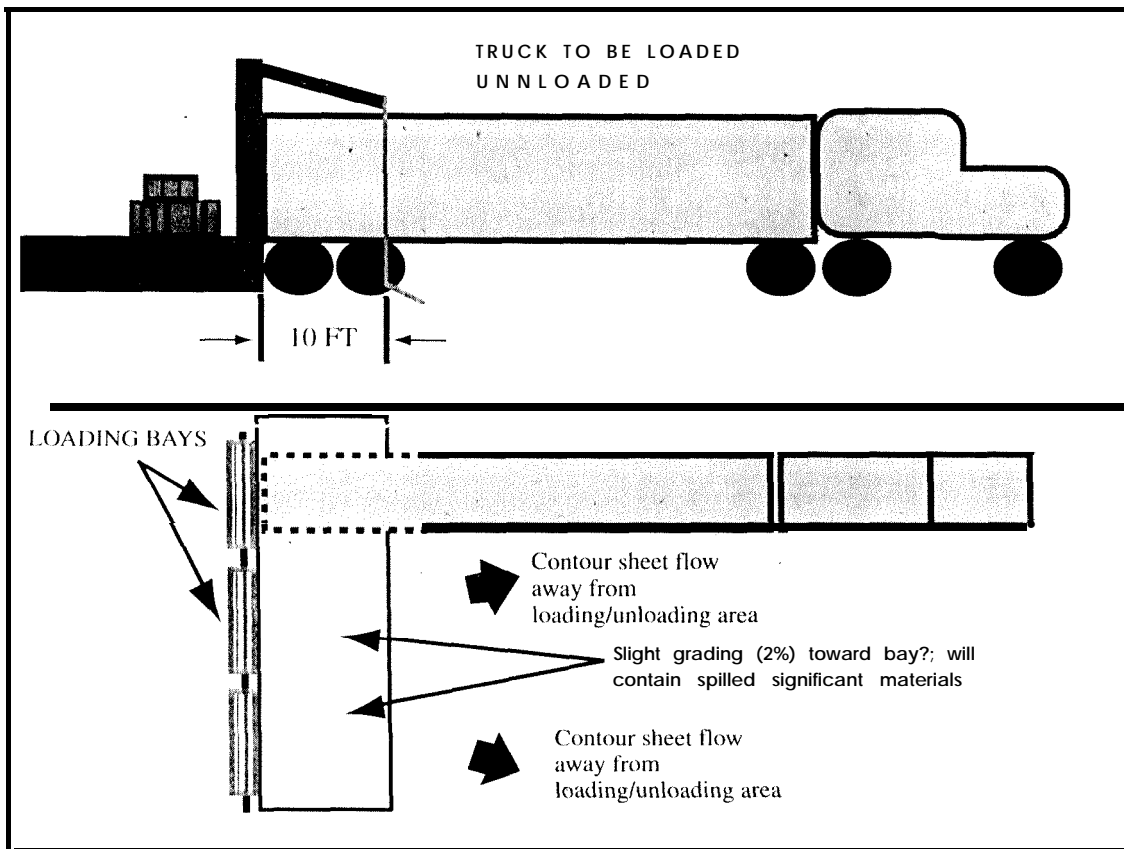
Clay Layers - [Recommended specifications: Thickness - 6 inches] should be followed by a geo-textile fabric should be placed on the liner [Recommended specifications: Puncture Strength - 135 to 150], then by several inches of organic earth, then by several inches of washed pea gravel. The shed must have a roof that does not leak, is sturdy and dependable. The roof drains should discharge outside the bermed area.

Tarp - must be water proof.





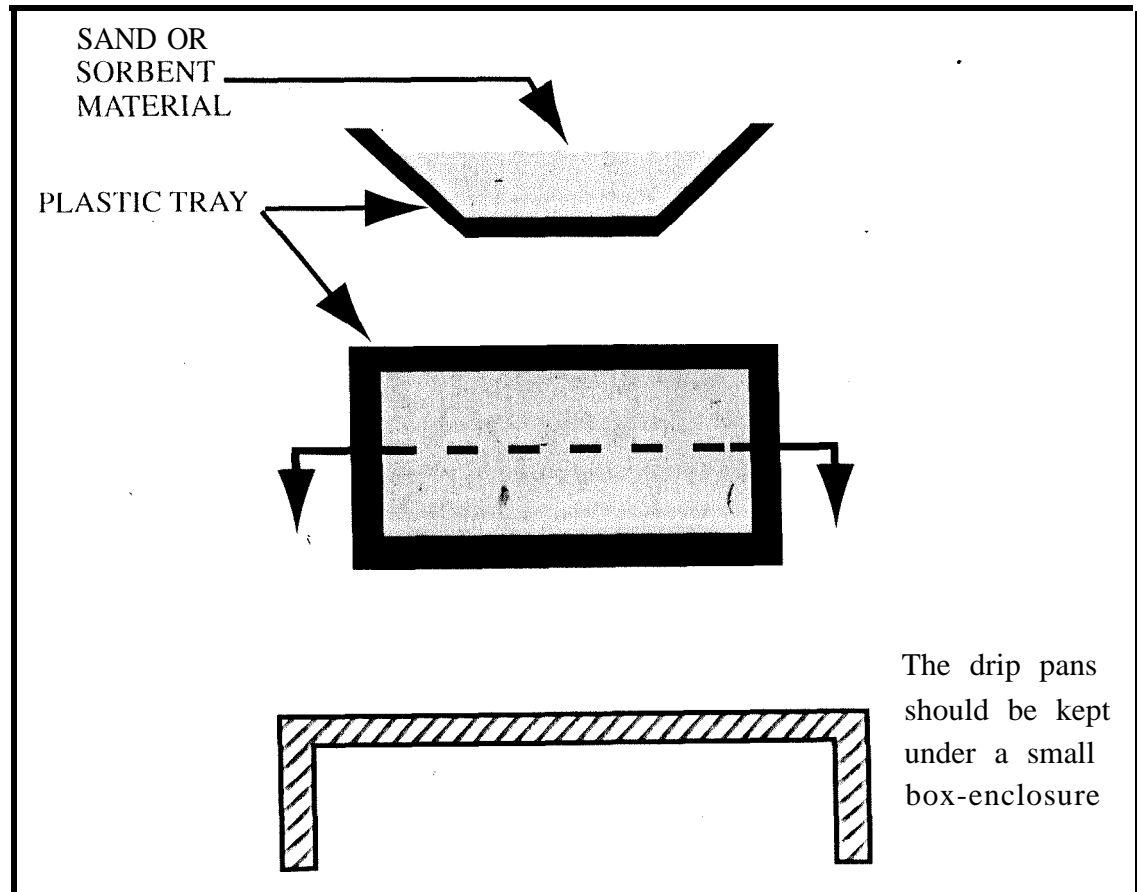
# Example of Structural Control for Enclosing the Loading and Unloading of Significant Materials





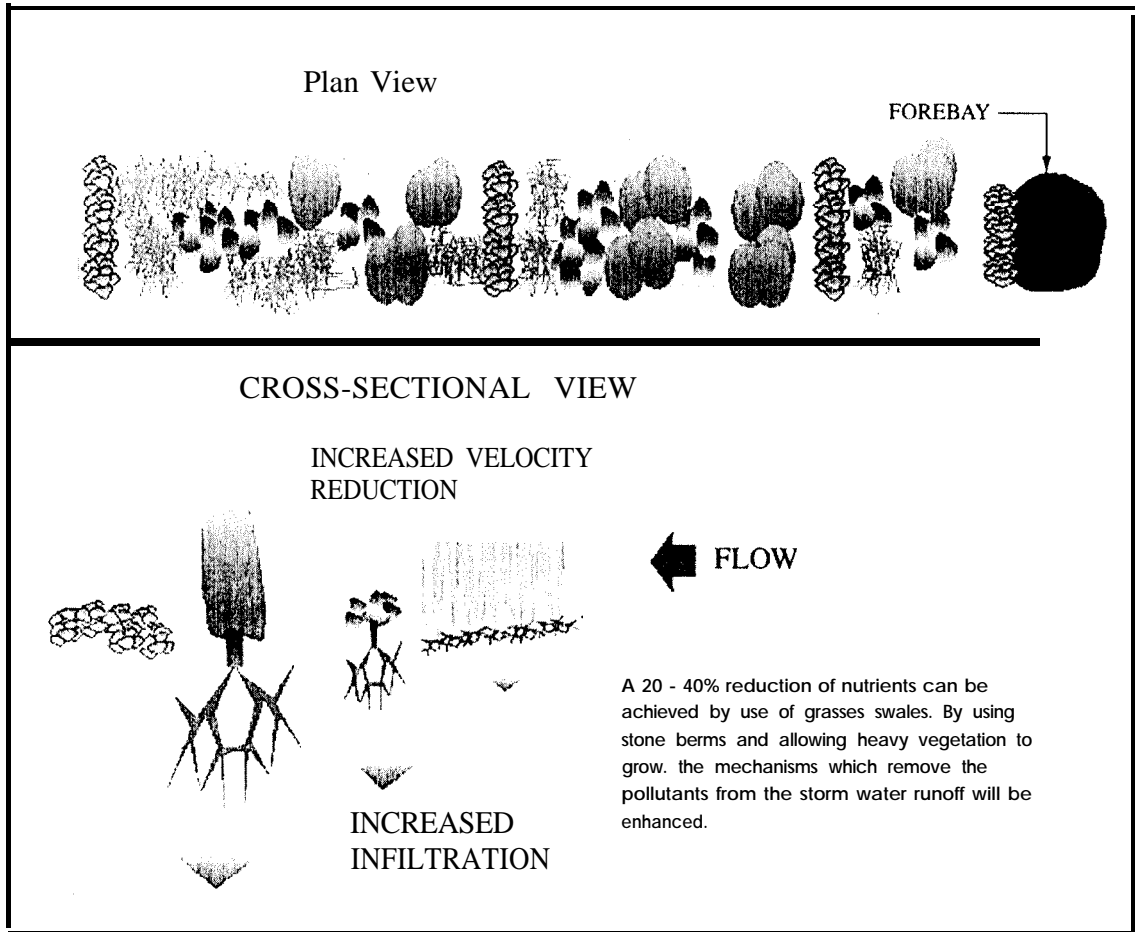
## Example of a Fueling BMP - Drip Pans

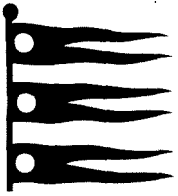
Drip pans should be made of plastic and should contain either sand or sorbent materials. Several inches from the top of the pan to the level of the sand or sorbent material should be maintained to prevent spillage. Cement mixing pans can serve as excellent drip pans.





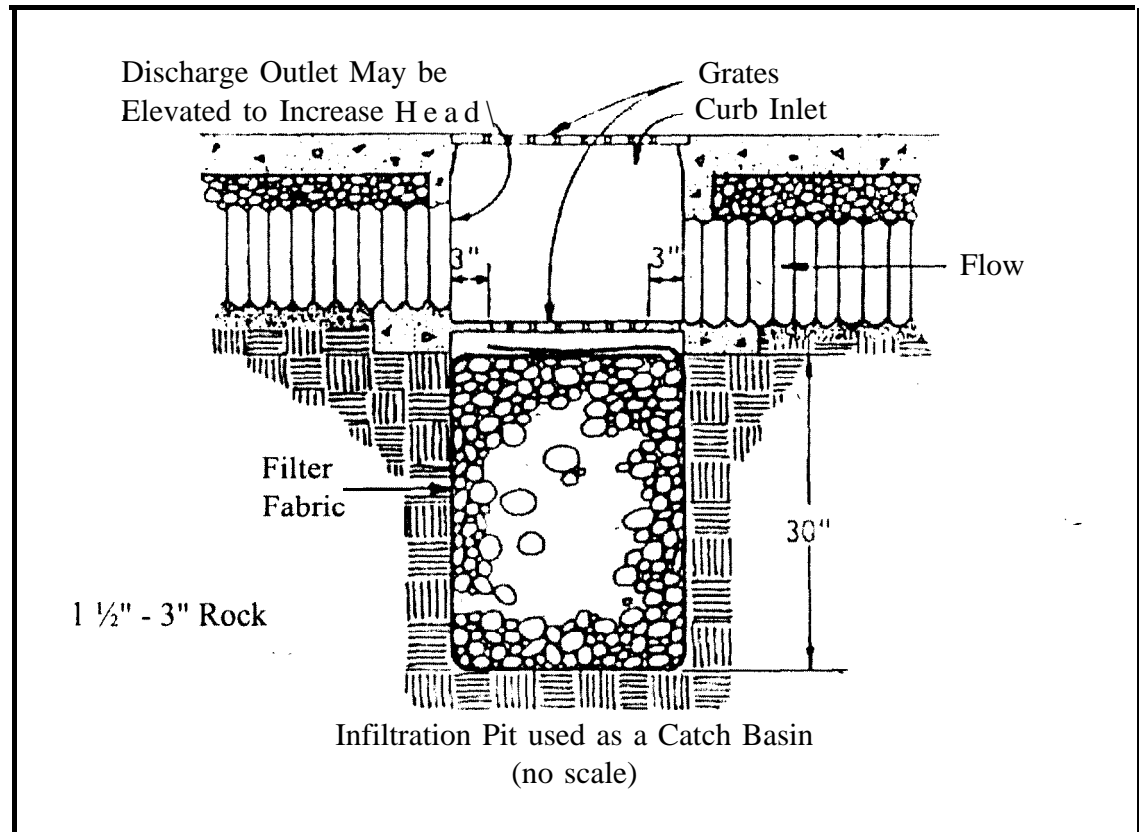
# Conceptual Example of a Biofiltration Swale for use as a Buffering BMP





## Infiltration Pit Used As A Catch Basin

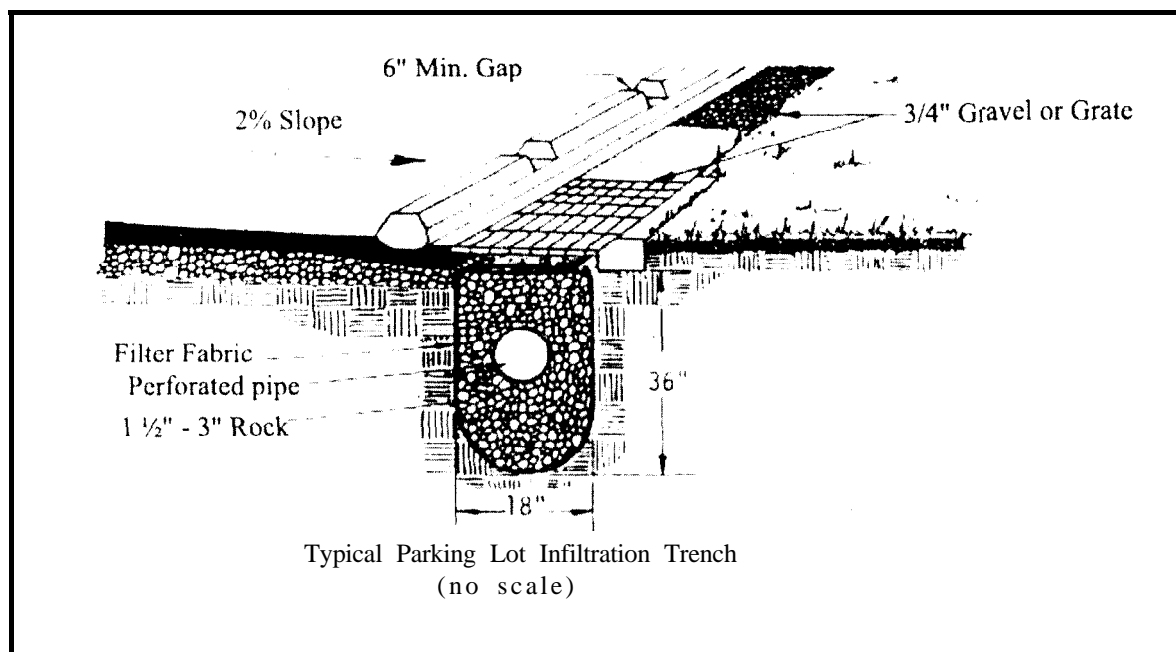
Infiltration BMPs should only be used for storm water not associated with industrial activity. When infiltration is used, we advise caution because there exists a high potential for clogging.



Source: Lake Tahoe Basin, Water Quality Management Plan, Vol. II,  
Tahoe Regional Planning Agency



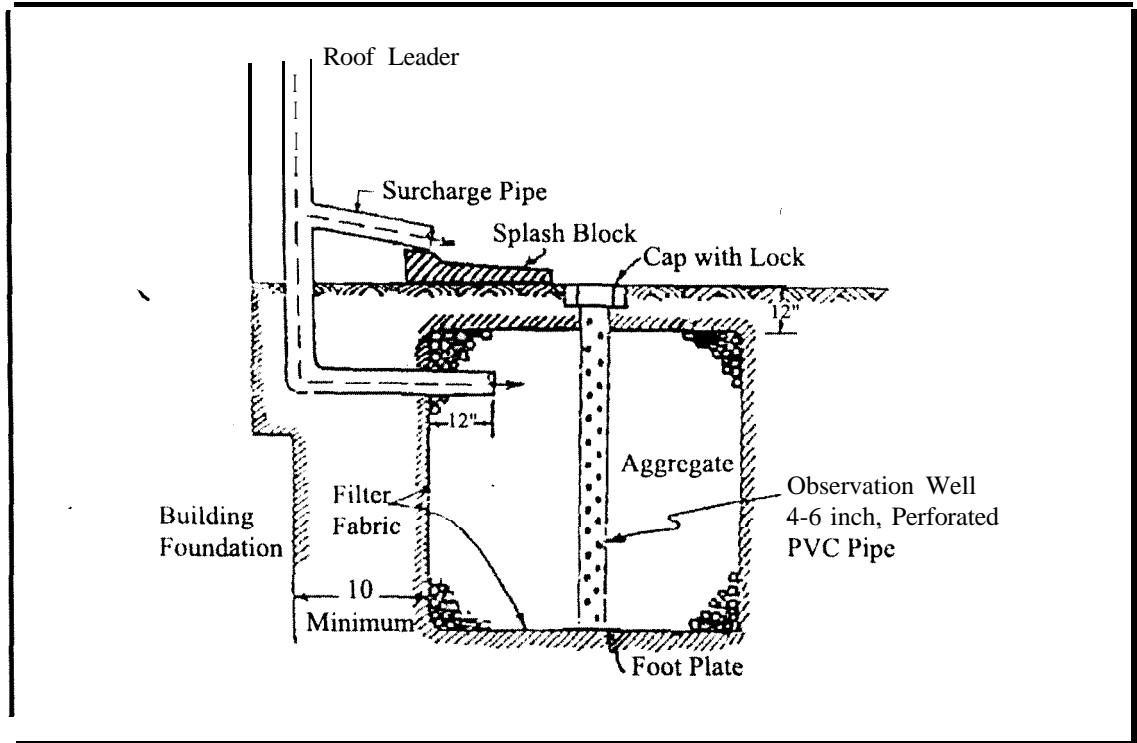
## Typical Parking Lot Infiltration Trench



Source: Lake Tahoe Basin Water Quality Management Plan, Vol. II,  
Tahoe Regional Planning Agency



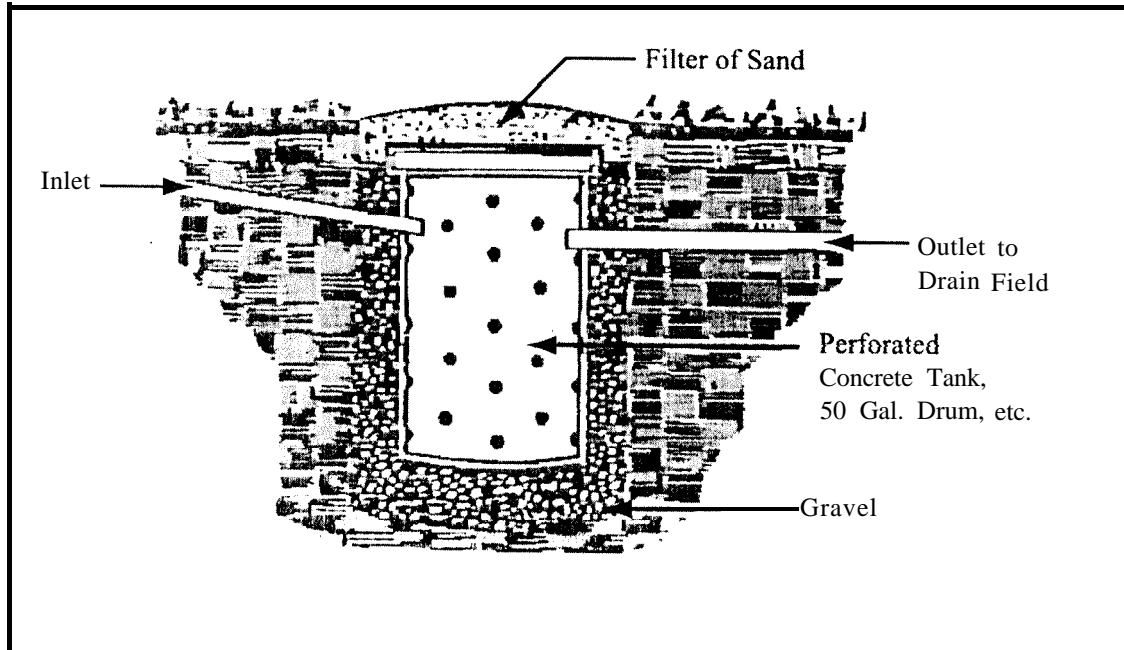
## Downspout Infiltration Practice



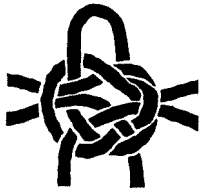
Source: Standard for Infiltration Practices. Maryland DNR 1984.



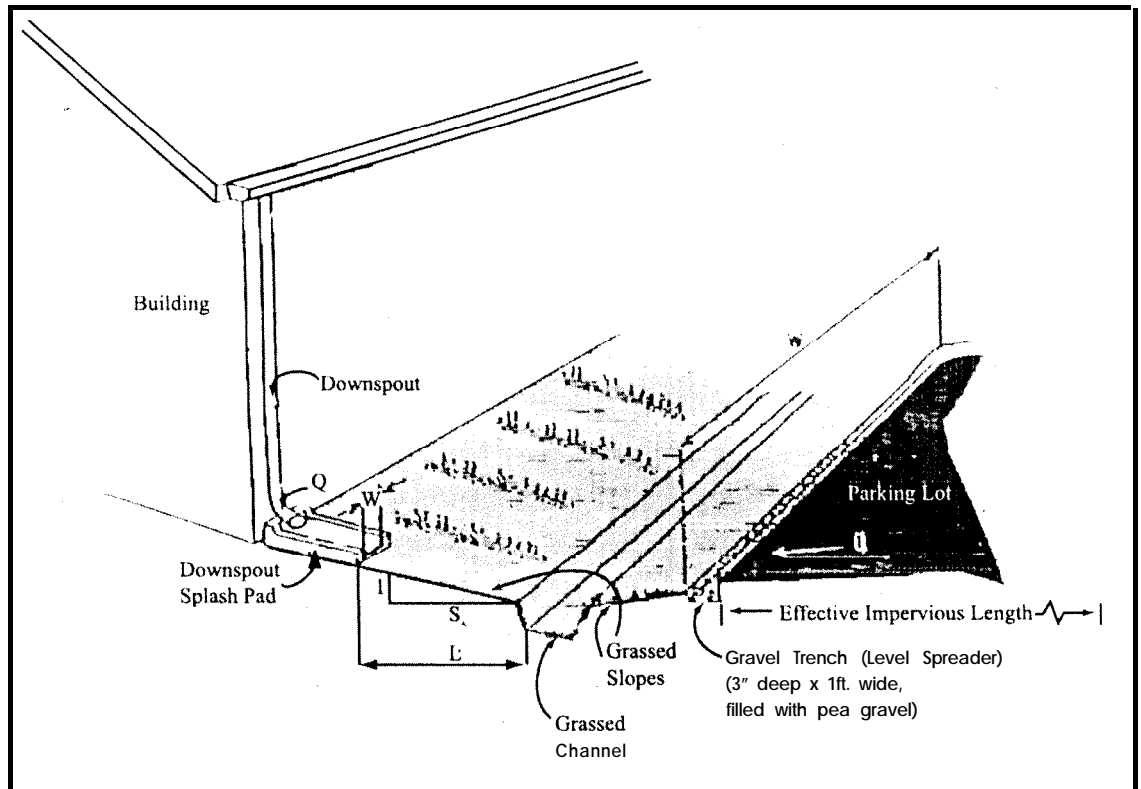
## Typical Dry Well Cross Section



Source: City and Community Design Guidelines for Stormwater Management. Day and Crafton.



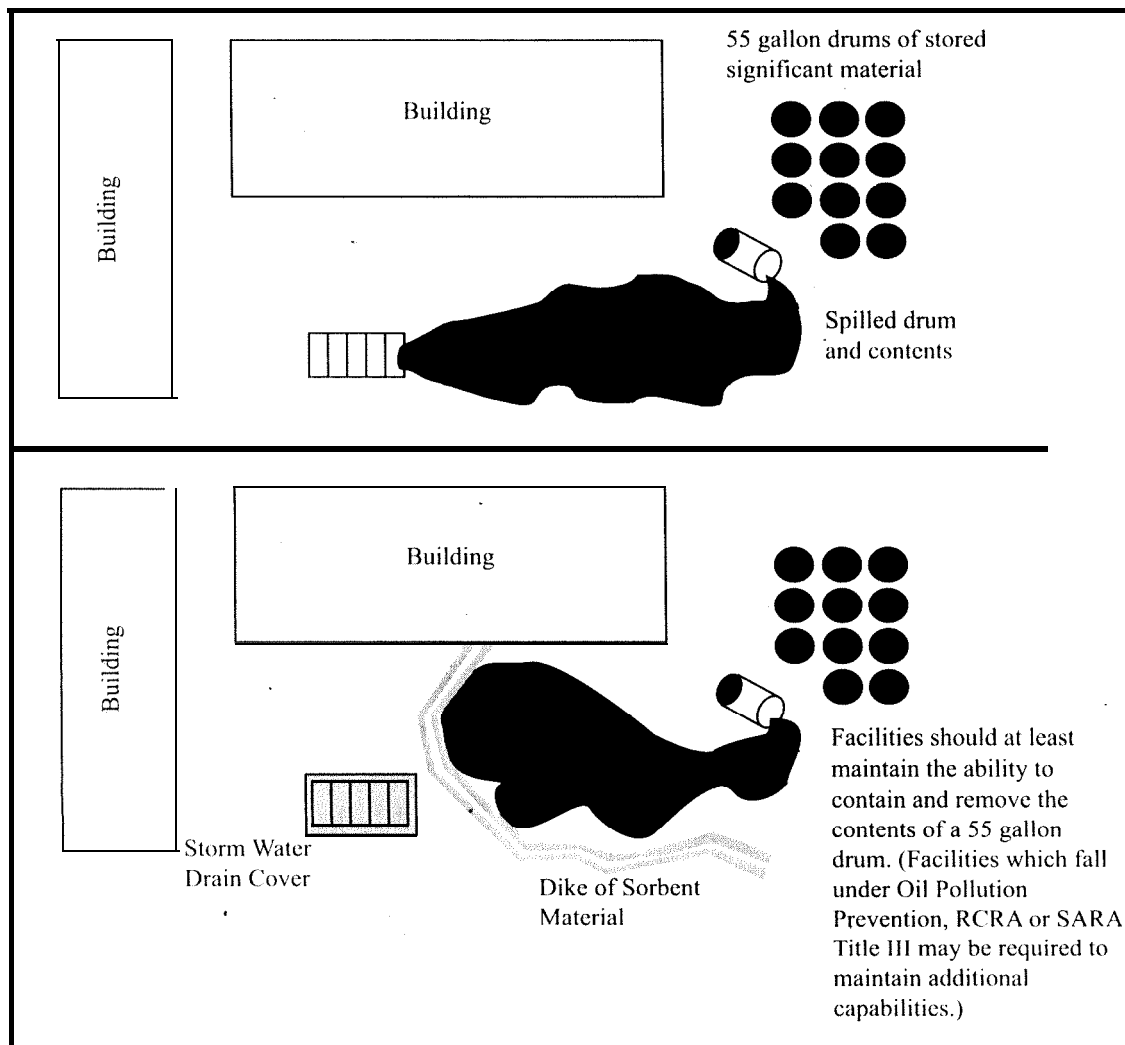
## Filter Strip Applications



Source: CH2M HILL, 1992.



## Example of a Response to a Spill of a Liquid Significant Material



This document is printed on Cross Pointe Genesis 80 lb. text and 80 lb. cover weight. It contains 100% recycled post-consumer fiber, is acid free and has no coating. Genesis meets or exceeds all guidelines for recycled fiber and post-consumer waste content, as set forth by the U.S. Environmental Protection Agency, the Canadian Environmental Choice Program and each of the 50 individual U.S. States. The fountain solution used contains no isopropyl alcohol and no VOCs. The ink is soy based, and contains no chlorine and no heavy metals.