



Equipment Wash Pad Module

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Table of Contents

Introduction	2
Potential Contaminants	2
Regulatory Picture	3
Turf Industry Wash Systems	4
Treatment Systems	4
On-Site Closed Loop Treatment Systems	4
Off Site Treatment - Discharge to Sanitary Sewer	5
Separation Systems	5
Dog Leash System	5
Catch and Release – Above Ground	5
Catch and Release – Below Ground	6
Equipment Wash Priority List	6

Introduction

Cleaning mowing equipment after each use is a common practice throughout the turfgrass industry. Wash stations are usually outfitted using water with relatively low pressure (< 100 psi) and high volume (20-80 gallons per minute). Pressure washers that generate a stream of high pressure (>1500 psi) and relatively low volume (< 20 gallons per minute) are not favored because they can be destructive to the bearings and other fittings on the equipment. The simple objective of the operation is to remove the clippings from the equipment so it's clean for the next use. Along with the clippings, dirt collected on the decks, reels, wheels, and carriage of the mowers are also removed in the wash process. Only in those instances where the wastewater is recycled and treated or sent to an appropriate wastewater treatment facility should the facility consider washing engines or other parts that could introduce petroleum products into the discharged wastewater.

Potential Contaminants

It is common to find equipment-washing stations located near surface water bodies. Early designs provided for the wastewater, clippings, and soil to be discharged from the wash area directly into a drainage ditch, stream, pond, or storm water catch basin. The watercourse provided the means to dilute the waste and move it away from the wash area. Grass clippings along with the soil washed from the machinery represent a significant organic load with the potential to contaminate surface water resources. The primary contaminants of issue in grass clippings are the nutrients nitrogen and phosphorous. The percentage of nitrogen and phosphorous in grass clippings are similar to that represented in animal manure as described in the table below.

Approximate Nutrient Percentage By Weight			
	Total Nitrogen	Phosphorus	Potassium
Dairy Cow + Bedding	2.5	1.1	2.7
Swine Manure	2.7	2.5	2.2
Poultry Manure	5.0	4.2	4.2
Grass Clippings	2.75-3.50	0.3-0.5	1.0-2.5

Nitrogen and phosphorous deposited in natural surface water systems are problematic as they can promote the growth of aquatic vegetation. Phosphorous in particular, is a catalyst for algal growth. Aggressive aquatic plant growth can change other characteristics of the water system that lead to overall degradation for wildlife and recreational uses. Soil carried away in the wash water can be suspended in the water column, deposited on the bottom, and can carry nutrients into the water. All are considered derogatory to aquatic systems.

Therefore, identifying clippings as “green manure” is an appropriate mental image. Everyone knows what happens to a pile of grass clippings that gets hot and wet - it

can quickly turn anaerobic, turn into a slimy mess and create a powerful stench. This slurry will release the phosphorous and nitrogen as the clippings degrade and can move downstream if they are not segregated from the water system.

Regulatory Picture

The use of water to clean turf equipment is defined as a “wastewater” because it carries liquid waste resulting from an industrial or commercial process. As such, the Michigan Department of Environmental Quality (DEQ) regulates the discharge of this water. The technical guts of this regulation are found in Section 3109 of Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451). It states that-

“a person shall not directly or indirectly discharge into the waters of the state a substance that is or may become injurious to any of the following...to the public health, safety or welfare...”

The “waters of the state” means groundwater, lakes, rivers, streams, wetlands, and all other water courses. Section 3112 of Act 451 also requires that a person shall not discharge waste or waste effluent into the waters of the state unless the person is in possession of a valid permit from the department.

In August of 1999, the Waste Management Division (WMD) of the DEQ released new rules to regulate the discharge of wastewater to the ground, or more specifically to groundwater since any discharge to the ground surface has the potential to reach groundwater. These rules are referred to as the “Part 22 Rules”. This rule making process was a remarkable effort for the DEQ and took over 6 years to complete. It involved collaboration with many user groups, public meetings, and legislative oversight. Overall, the rules are preventative in nature and are intended to prevent contamination that could pose an unacceptable environmental or health risk. No discharge can become “injurious” meaning that it cannot cause groundwater to lose its usefulness for drinking, agriculture, recreation, industry, or other uses.

The Part 22 rules group discharges into six categories and define what type of permit is required for each category. The categories range from those that are exempt from a groundwater discharge permit to those requiring highly a detailed groundwater discharge permit involving routine and individualized agency review. Let’s examine each of these categories.

1. Exemptions – There are approximately 25 types of groundwater discharges listed in the rules that are exempted, or not required to have a permit to discharge. These are discharges that are common and pose little environmental or health threat. They range from household septic systems to the use of portable power washers. By working directly with the Waste Management Division, specific criteria will be established so mowing equipment wash systems in the turfgrass industry are not required to obtain a groundwater discharge permit. Details of how turf systems should operate

in order to be exempted are explained below in the “Turf Industry Wash Systems” section.

2. Notifications – The discharges in this category must notify the department of their activities through the filing of an application form.
3. Certifications – The discharges in this category must file an application form, and wait for department approval before they can begin discharging.
4. General Permit – This authorization is for groups of dischargers having the same type of wastewater. Criteria have been developed which if met by a discharger, they file an application form, and if the department concurs they meet the criteria of the general permit, they receive a certificate of coverage.
5. Specific Discharges – The department has established specific engineering criteria for treatment systems that the applicant must meet to qualify for this authorization. This category includes sanitary sewage less than 50,000 gallons per day and laundromat wastewater less than 20,000 gallons per day.
6. Permits – This category is for all other dischargers not listed elsewhere in the rules, and has very extensive engineering and hydrogeologic requirements.

Turf Industry Wash Systems

There are several options available to discharge wastewater from the wash stations without requiring a permit from the DEQ. I have categorized the options into systems where the water is treated or systems where the clippings are separated and the water is discharged on-site. Treatments systems involve on-site equipment that clean the water or where the water is discharged to a local treatment facility via a sanitary sewer connection. A separation system has specific criteria of how the water is handled and discharged. The Water Bureau has identified the basic criteria for use on turf management sites and when used according to these directions, does not require a permit.

Treatment Systems

On-Site Closed Loop Treatment Systems

There are several high-tech machines available on the market that offer a “closed loop” whereby the same water is used over and over and there is no discharge from the system. They offer a variety of filter systems ranging from mechanical screens, chemical filters, and ozone treatment to the use of biological digestion. There are some distinct advantages to this type of system. They are designed to trap or treat variety of wastes including petroleum, pesticides and nutrients. Therefore, they could be used for the everyday washing of equipment, they can handle petroleum products from engine cleaning, and they could also be used as a pesticide mixing and loading pad. The disadvantage is that the initial and maintenance costs are higher than other systems.

Off Site Treatment - Discharge to Sanitary Sewer

Wash systems can be connected directly to a sanitary sewer. Since the waste is being treated by a wastewater treatment facility downstream, the water can contain some clippings, soil or even minor amounts of petroleum products. Before your wash station is hooked into a sanitary sewer system, you must have authorization from the treatment facility. It is optimum to have some type of screening mechanism to separate the clippings from the water stream. This system has been successful at the Kalamazoo Country Club.

Separation Systems

These systems are designed to separate the clippings from the water and then discharge the water on site. The primary criteria that must be followed for this use to be allowed without a permit are listed below. A few specific examples of successful systems follow the basic criterion.

- Do not discharge the wash water to a surface water body. This includes wetlands, ponds, lakes, streams and stormwater catch basins.
- The wash water should not contain any additives, including soaps or degreasers.
- Do not wash motors or directly discharge petroleum products into the wash water.

Dog Leash System

This system is simple. Just use a connection to the irrigation system and wash the equipment over a turfed area where the water will infiltrate and will not flow across the surface into a water body. The spot where the equipment is washed should be moved around like a dog on a leash so the area does not become muddy and problematic. The need to move the wash spot will depend on the amount of water used and the percolation rate of the soil. The advantages of this system are low cost and no need to handle the clippings as they can settle into the existing turf. A few golf courses within the Huron MetroPark Authority Golf Courses currently use this system.

Catch and Release – Above Ground

In this system, the clippings are captured through some type of screening mechanism and the wash water is released to the ground surface for infiltration. There must be no connection to surface water in this system. The clippings are collected and either returned to a turfed area or composted. The advantage of this system is relatively low cost but it demands handling of the captured clippings. Systems that have been successful are located at the Marysville Golf Course, Gull Lake View and Spring Lake Country Club to name a few.

Catch and Release – Below Ground

This system is similar to the above ground Capture and Release process, but the water is discharged to an underground infiltration network like those used in a septic system. The clippings can be captured via an above ground screening system or a tank containing separation baffles that trap the clippings from the water (septic tank or oil/water separator). If a tank is used, the grass clipping sludge must be removed and disposed of by a licensed Liquid Industrial Waste hauler. This waste is does not meet the definition of “septage” so a conventional septic tank hauler is not authorized to dispose of this material. An above ground clippings screen with an underground discharge field is being used at Gull Lake View – Stonehedge Golf Course. A septic tank and underground discharge field is being used at the Wuskowhan Players Club.

Equipment Wash Priority List

Review the equipment wash systems in this module and indentify actions that would improve your operation and list them below.

1. _____
2. _____
3. _____