

Engineering Data Sheet

7218

Subject: Stormwater Runoff and Washdown Treatment Application: Automotive Dealership/Service Stations

The Problem

Stormwater runoff and washdown treatment quality is the responsibility of the property owner or user. Today's environmental regulations require removal of oils and other contaminants from waters that are discharged from a property site.

Some properties, such as parking lots, have stormwater discharges that generally contain minor levels of contaminants. Others, such as automotive dealership and service stations, generally contain high levels of contaminants. Stormwater runoff waters usually contain free oils that require the use of a simple gravity type oil/water/grit separator to achieve compliance with most regulations.

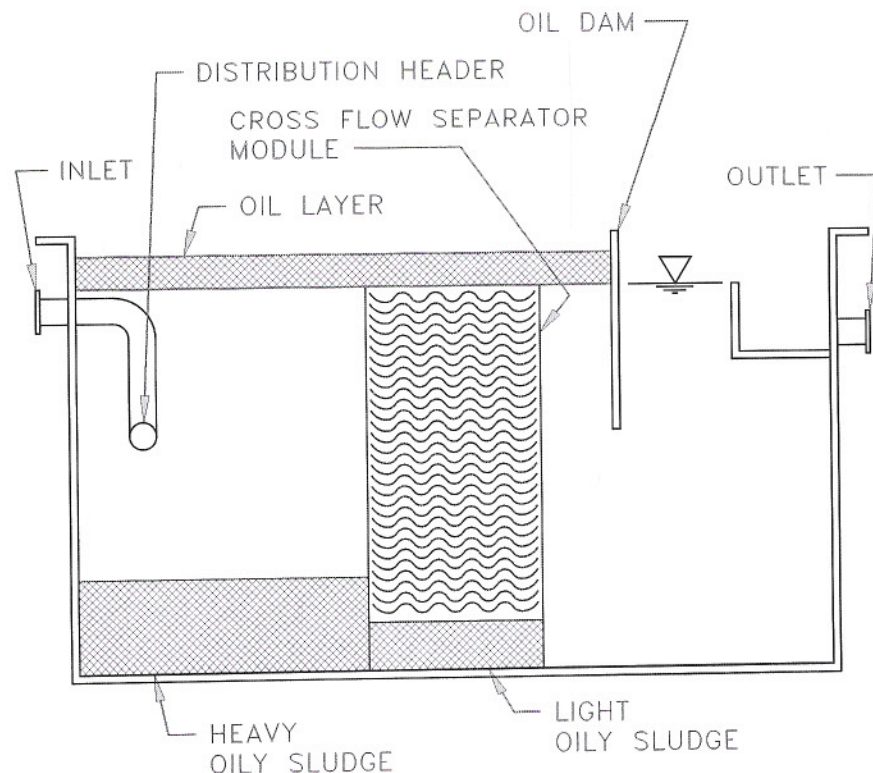
A few jurisdictions, such as the City of Baltimore, Maryland, are also concerned about the removal of heavy metals (especially lead) from stormwater runoff. A well-designed gravity type oil/water/grit separator also removes lead to acceptable levels.

By comparison, automotive dealership/service station washdown wastewater may contain elevated levels of oils (lubricating, transmission, brake, and power steering) as well as radiator coolants and window washing solvents. Because of floor and engine cleaning and degreasing activities, degreasing solvents as well as detergents may also be present.

The more contaminants present the more sophisticated the treatment required to achieve compliance with EPA, state or city discharge permits - - whichever apply.

Contaminant Types and Their Removals

1. Free oil. This contaminant is almost always found in stormwater runoff from urban areas as well as commercial and industrial sites. Gravity type oil/water separators as shown in Figure 1 effectively remove free oils.
2. Heavy metals. These contaminants will also be effectively removed in a gravity type oil/water separator. See also Figure 1.



2. Emulsified oils are of two types, mechanical and chemical.

A. Mechanically emulsified oils are formed when stormwater runoff is **pumped** with a centrifugal type pump. The use of a positive displacement type pump does not generate mechanically emulsified oils. Mechanically emulsified oily water is milky white in appearance. If it is present, its removal must be accomplished with more sophisticated equipment than a simple gravity separator. For automotive dealership/service stations, a coalescing cartridge type filter will effectively remove mechanically emulsified oils as shown in Figure 2.

If the runoff also contains high concentrations of free oils or settleable solids, the use of a simple gravity separator upstream of the coalescing cartridge filter will result in a higher initial installation cost but a much lower long term operating cost since the cartridge filters must be replaced when they have become saturated with oil. See Figure 3.

B. Chemically emulsified oils are formed whenever detergents come into contact with oily waters. Power spray wash equipment which use detergents as well as detergent based engine degreasing and floor cleaning operations are typical examples which generate chemically emulsified oils. Chemically emulsified oils also have a milky white

appearance similar to mechanically emulsified oils, except that the milky white color is more intense.

For automotive dealership/service stations, a coalescing cartridge filter to remove particulates followed by a chemical adsorption contactor to remove chemically emulsified oils will effectively treat this type of runoff. See Figure 4.

Again, if the runoff also contains high concentrations of free oils or settleable solids, the use of a simple gravity separator upstream from the emulsified oil removal system will result in a higher initial cost but a much lower long term operating cost since the cartridge filters and chemical adsorption contactors must both be replaced when they have reached their respective treatment capacities. See Figure 5.

4. Dissolved organics consist of windshield solvent, radiator coolants, engine degreasing washwater, and chemically emulsified oils. If any of the above contaminants are present, their removal may be effectively accomplished in a chemical adsorption contactor. In order to maximize the capacity of the contactor, the use of an upstream coalescing cartridge filter is necessary. See Figure 6.

As before, if elevated levels of either oils or settleable solids are present, the use of a simple gravity separator is recommended to further lower the long term operating costs. See Figure 7.

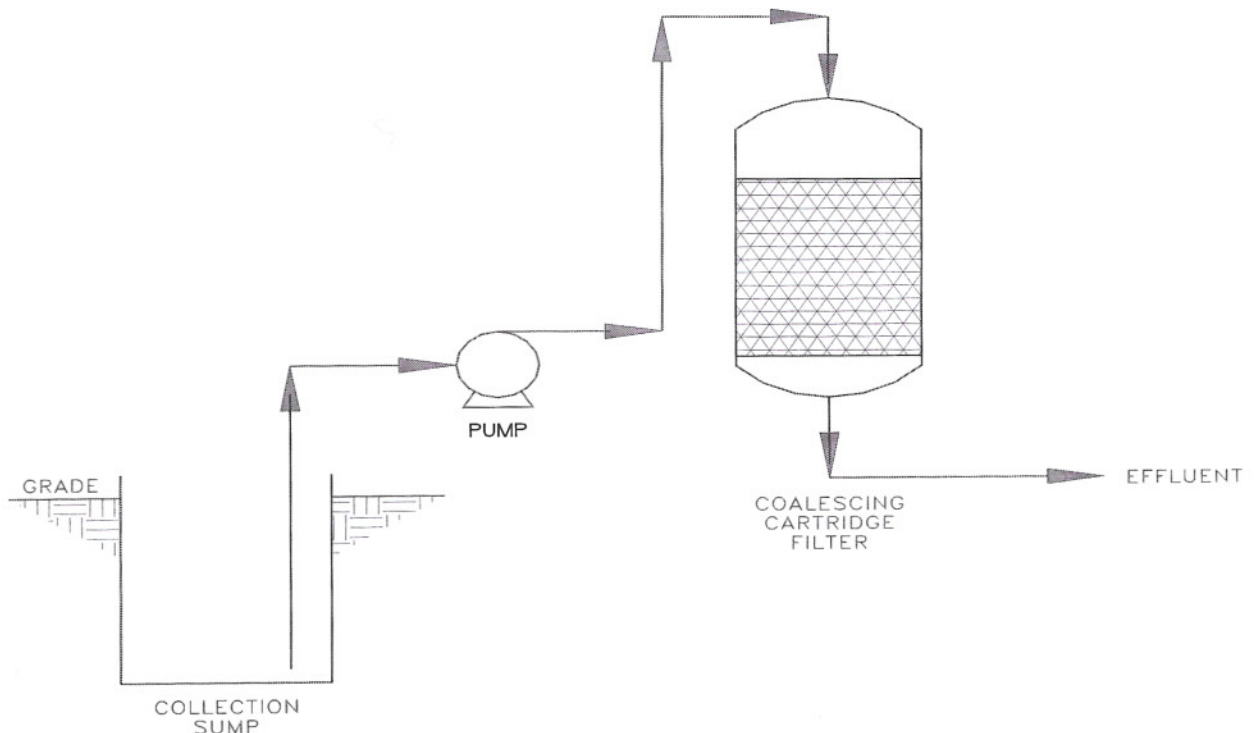


Figure 2

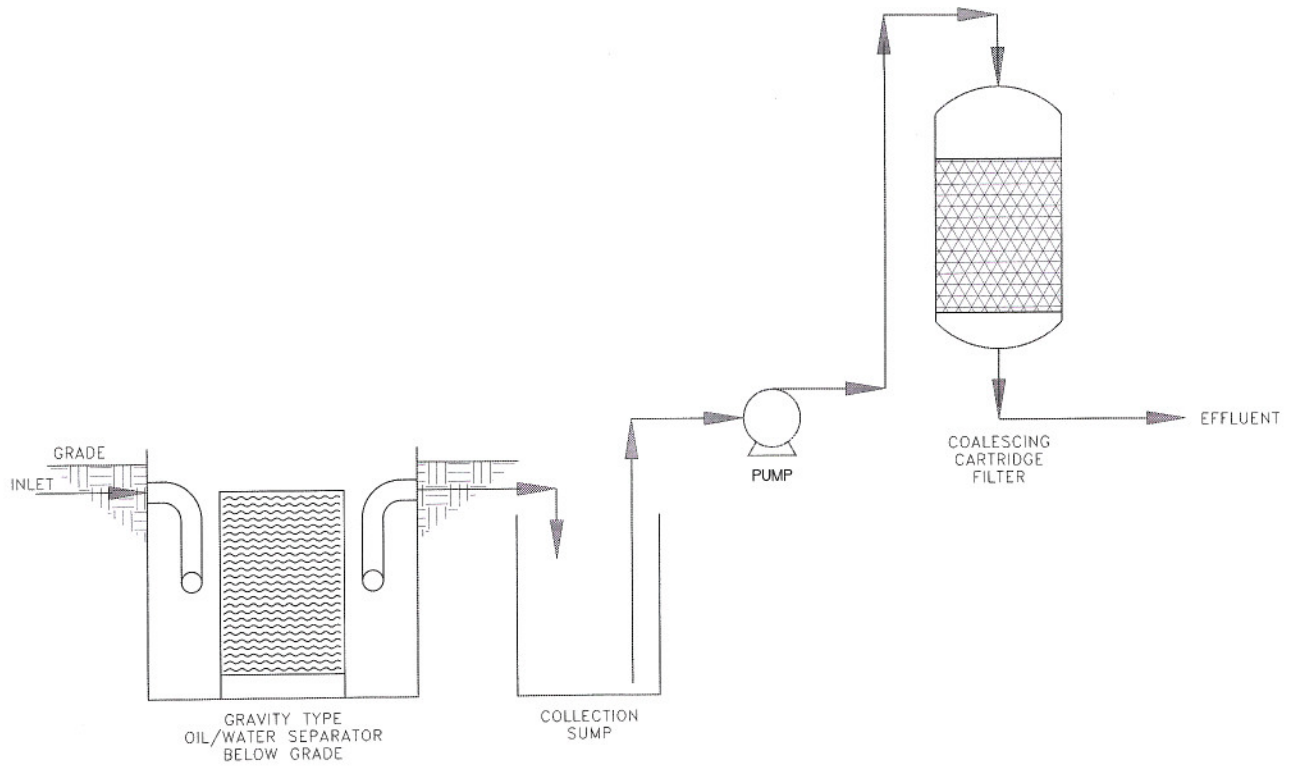


Figure 3

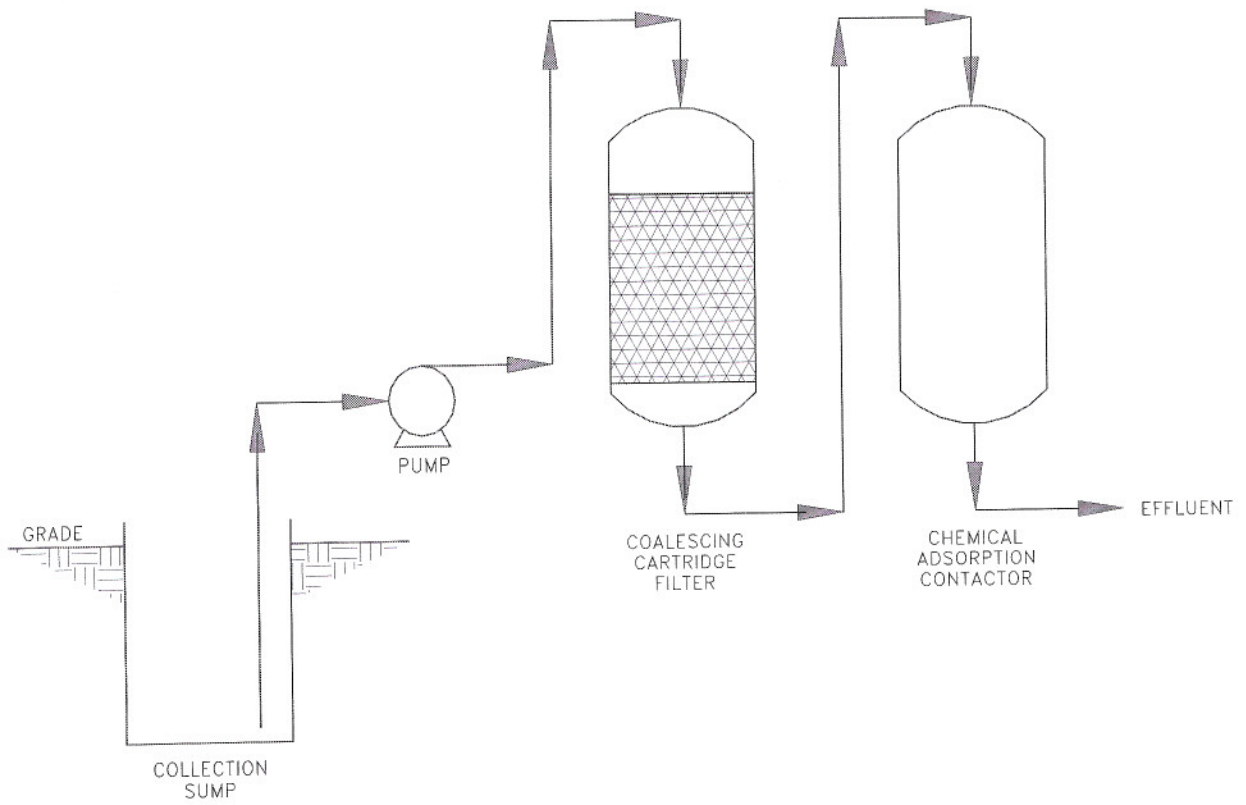


Figure 4

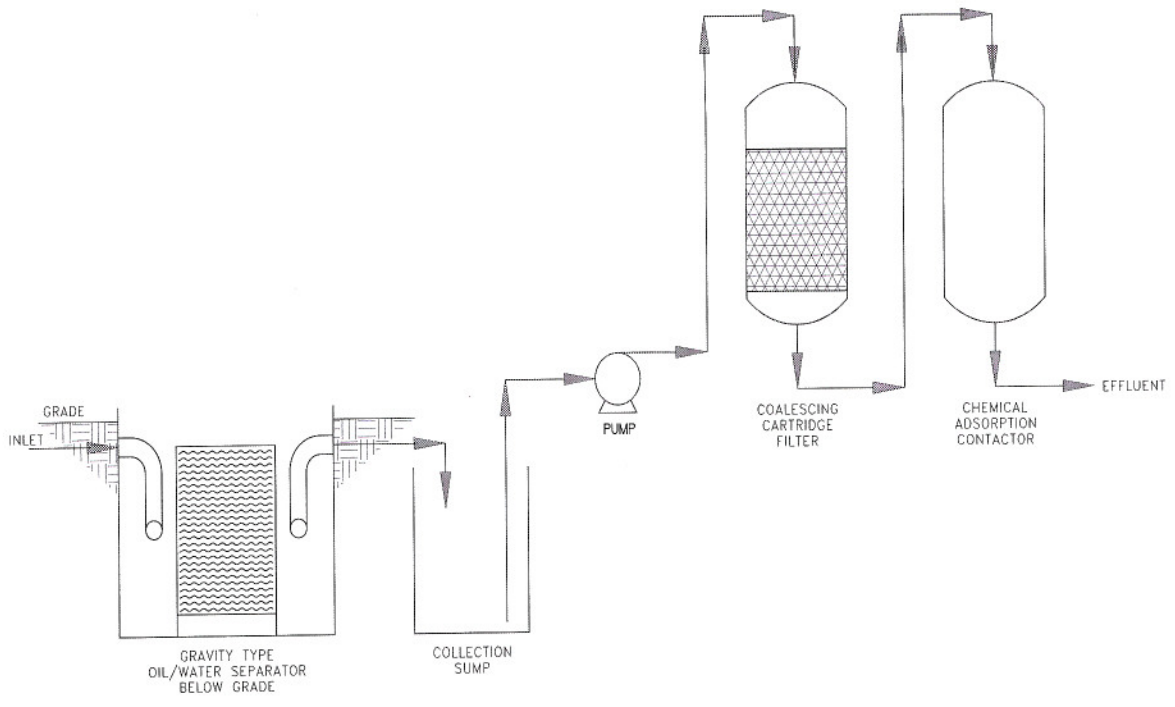


Figure 5

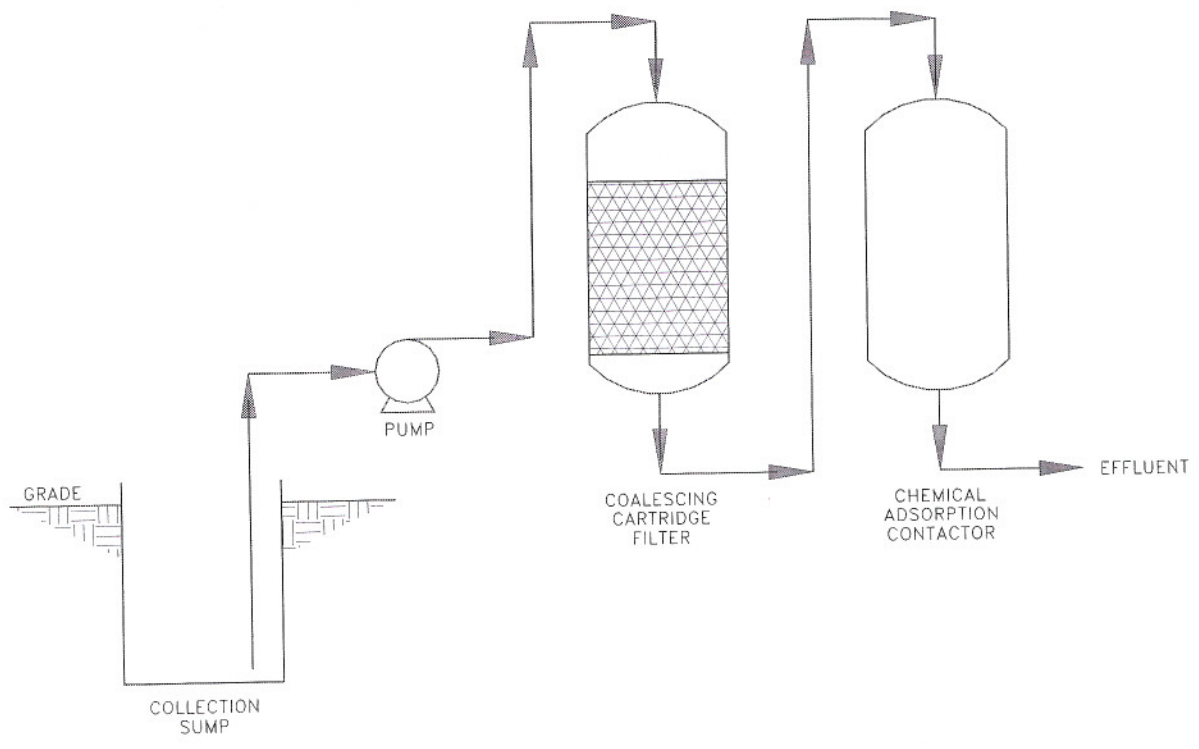


Figure 6

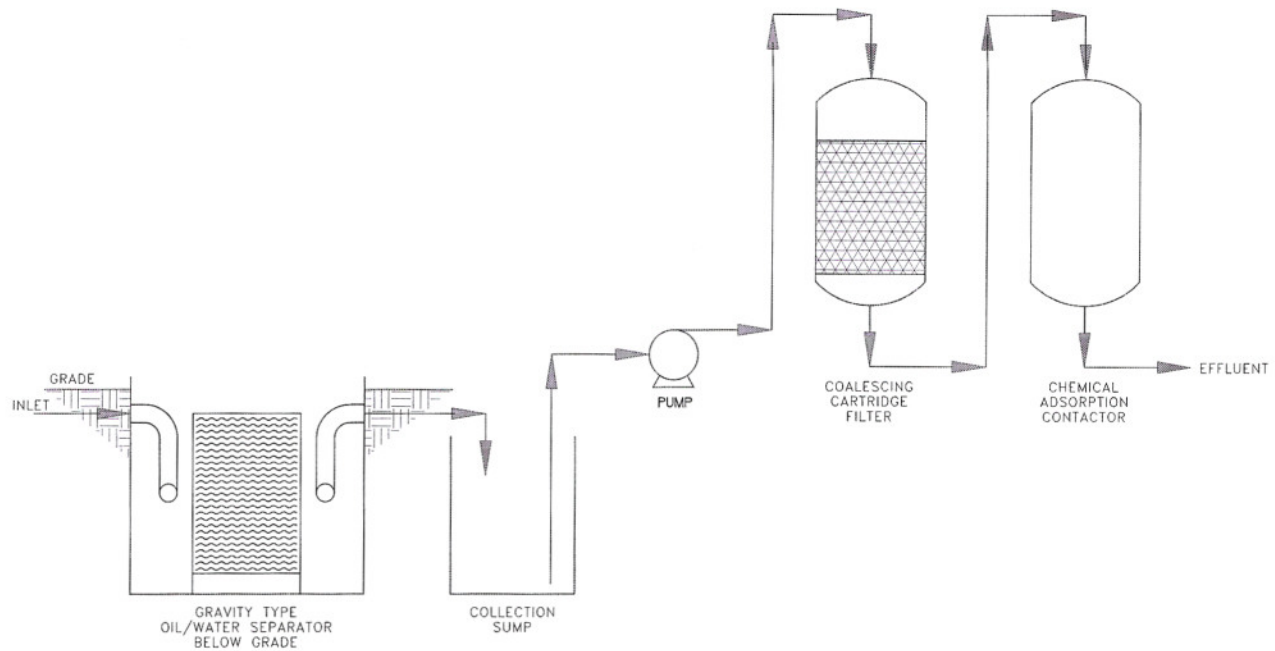


Figure 7

Steps to take to achieve regulatory compliance at each automotive dealership/service station

1. Have representative sample(s) of stormwater taken and analyzed for contaminants.
2. Determine the rate of flow that must be treated.
3. Select the treatment method to be used based on the design conditions established by 1 and 2 above.
4. Obtain installation permit, if required.
5. Purchase, install, and start-up the equipment.

Depending on the technical level of in-house expertise, it may be appropriate to retain the services of a licensed professional registered engineer to:

1. Determine rainfall runoff and/or wastewater treatment flows

2. Perform site engineering
3. Recommend specific treatment system
4. Assist in obtaining installation and other permits, if required.

WaterSmart Environmental, Inc. is a national manufacturer of oil/water separators (all types referred to above) and other water and wastewater treatment equipment. A comprehensive design manual on oil/water separation and pricing/availability information is available from the company on request. Services available to prospective customers and consulting engineers include laboratory testing for contaminants as well as treatment recommendations.

A performance guarantee is standard whenever laboratory testing is performed and our treatment recommendations are followed. Under this guarantee program, **WaterSmart Environmental, Inc.** will fully reimburse the owner for any fines imposed due to unacceptable performance.

From the Engineering Department of

**WaterSmart
Environmental, Inc.**

