Guidance on Wash Water Discharge from Vegetable Pack Sheds – Advice on System Design

Background. Commercial vegetable farms in Vermont need clarity about how to handle vegetable wash water discharge. While there are no regulations specifically aimed at vegetable wash water, this material is considered to be 'process waste water' and thus comes under Agency of Natural Resource rules and the Required Agricultural Practice rule intended to protect water quality. If washing vegetables without otherwise processing them, a permit is not required to discharge wash water. However, wash water may not be discharged directly into surface water such as a lake, pond, stream--or a ditch that empties into surface water.

The discharge of vegetable wash water may result in increased nutrient loading in waterways, erosion, and other environmental impacts. The goal for a wash water discharge system is to provide an area that prevents direct flow into surface water and ground water allowing nutrient uptake by vegetation and possibly separation of sediment for removal.

For example, a wide, long (at least 100 ft.) vegetated strip with a slight slope (0.3 to 6%) can result in slow movement of the discharge water across a relatively large area of land. This slows the vertical movement of water though the soil into groundwater and allows a longer period of nutrient uptake in the vegetation from the top layer of saturated soil.

Growers should design a system that will:

1) Avoid wash water pooling or gullying that may lead to drainage into surface water.

2) Provide sufficient grass/sod area to absorb the wash water discharge (for help determining the proper sizing of a vegetative treatment area see Table 1 and Table 2, below.)

Table 1. Approximate vegetated area (ft^2) needed to absorb certain volumes of wash water *based on the most restrictive soil layer within the root zone*.

Wash Water Volume	Gravelly Sand No Fines Perc Rate ~ 10 min/in	Gravelly Sand Little Fines Perc Rate ~ 40 min/in	Well Graded Sand Little Fines Perc Rate ~ 60 min/in	Sand or Silt Loam Little Clay Perc Rate ~ 120 min/in
	Absorption Area (ft^2)			
100 gal/day	130	260	320	460
500 gal/day	660	1,320	1,610	2,280
1,000 gal/day	1,320	2,640	3,230	4,560
1,500 gal/day	1,980	3,950	4,840	6,850

Table 1 Notes:

1. A percolation test is advisable when the soil is comprised of clay and/or organic material
2. When possible, absorption areas should be sized using site specific permeability or percolation rates

Table 2: Approximate vegetated area (ft^2) needed to absorb certain volumes of wash water *based on Hydrologic Soil Group (HSG), where no restrictive layer exists in the top 40 inches*.

Wash Water Volume	HSG A Infiltration Rate: >1.4 in/hr	HSG B Infiltration Rate: ≈1 in/hr	HSG C Infiltration Rate: ≈0.3 in/hr	HSG D Infiltration Rate: <0.06 in/hr
	Treatment Area (ft^2)			
100 gal/day	120	180	550	2,920
500 gal/day	620	880	2,730	14,580
1,000 gal/day	1,230	1,750	5,470	29,170
1,500 gal/day	1,850	2,625	8,200	43,750

Table 2 Note: If high volume of water results in need for excessively large vegetated area, hydraulic controls or storage can be incorporated to reduce flow rate and decrease required area.

3) Provide a means for spreading the wash water over grass/sod area. This may be a single pipe in the case of small discharges; larger discharges will need a manifold of perforated pipe, an overhead irrigation (sprinkler), or some other system for spreading the water.

This perforated pipe allows a large volume of wash water to be discharged across a vegetative treatment area sufficient in size to absorb the discharged water before it can enter ground water or surface water. Photo: Joshua Faulker.

4) Avoid locating the grass/sod spreading area where bedrock or shallow groundwater may be present. The goal is to have a sufficiently deep soil to facilitate wash water absorption and eventually nutrient uptake by vegetation prior to contact with ground or surface water.

5) If necessary, provide a retention area (tank or holding pond) to allow large volumes of water generated by washing to be spread later, at a slow enough rate to allow for soil absorption. This may also allow for sediment separation and removal by using a catch basin, standpipe, etc.

6) When the ground is frozen, wash water may still be applied to the soil surface in a manner that avoids pooling/gullying and that avoids runoff into surface water.

Very large wash operations may require special design features, such as sediment traps, to operate effectively. In addition, large winter washing operations may require a buried distribution system (i.e. a leach field) to adequately treat/spread wash water in sub-zero temperatures.

Proper operation and maintenance are key to avoiding system failure.

It is important that concentrated flow of discharge water be prevented to avoid short-circuiting of the treatment area. Inspect and repair treatment area and distribution system to ensure even flow throughout. Fill in any concentrated flow paths, remove sediment or particle accumulation that diverts flow, and re-seed disturbed areas.

Check all components of the distribution system regularly to ensure they have not shifted due to frost heave or are clogged, and are generally functioning as intended.

Monitor and clean out settling facilities/basins and sediment traps on a regular basis to prevent clogging or transport of sediment to treatment area.

While vegetation in the treatment area should be mowed to encourage sheet flow, maintenance activities should only be performed when surface is dry to prevent compaction and rutting.

Wash water sanitizers must be used according to their labels with regard to rate and disposal. Some sanitizers do not have instructions about disposal. In this case, discharge in a manner that avoids entry into surface water or ground water (as described above.)

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