Managing Wastewater from Animal Wash Areas

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Situation

Animals for show and recreation are typically groomed on a regular basis. The process involves pre-wetting, applying wash solution, and rinsing it off. Thorough rinsing is essential to prevent the animal from getting dandruff.

Limitations

This publication offers guidance on how to handle wastewater from wash pads where animals are groomed or washed. It is designed for facilities using less than 1,000 gallons per week for grooming purposes only. This equals about 200 minutes of actual wash time per week using a garden hose. No other wastewater may be introduced to the system. Facilities such as kennels and veterinary offices using more water may need an alternate wastewater treatment such as a septic system (which may be classified as a class V injection well) or a lagoon. Please consult your local health department or KDHE district office for more information.

Recommendations for handling wastewater from wash/rinse areas vary depending on the site and use. Variables include wash frequency, soil properties, and surface cover. A grass filter strip is the preferred way to handle wash/rinse water. When washing occurs more than three days per week, the receiving area may be too wet for a grass filter on natural soil, so a submerged gravel or coarse sand wetland should be considered. Hair and solids are often troublesome. A floor drain grate should be adequate for a grass filter; however, a septic tank-type effulent filter should be installed in front of the wetland cell to remove as many solids as possible.

Show animals

Grooming is very important with show animals. A *Denver Post* article describes the daily washing and grooming at the National Western Livestock Show held each January as using exorbitant amounts of water. Washing times were reported to be 30 to 45 minutes per animal per day. At an average flow of 5 gallons per minute the water consumed could exceed 200 gallons per day per animal. This type of washing would be on a hard surface such as concrete where all water flows off. When washing will be daily or multiple times during a concentrated period such as county fairs, other options should be considered such as containment tanks (with pumping and hauling), an approved earthen lagoon, or discharge to a municipal system.

Recreation animals

Animals used for recreation — including riding, hunting, packing, companions, etc. — may get washed once or more a week. When the site is suitable, a grass wash area may be able to adequately filter the wash water. With a little planning, washing activities in areas of the state with coarse-textured soil could be done in a grassed area with good results. This eliminates the need to have any designed facility to treat runoff. The user should move to a different location each time the animal is washed for adequate distribution of wash-water onto the grass area.

In many areas where fine-textured soil will not allow direct infiltration, a wash pad and a filter strip should be used.

Design Criteria for the Wash Pad

Construct the wash pad so all water falling or collected on the surface is transferred to the dispersal area. The ground surface around the wash pad should slope away so all surface runoff in the vicinity is diverted away from the wash pad. See *Figure 1*.

When the grass filter is adjacent to the wash pad, the pad should be constructed so all runoff from the pad surface flows evenly across the width of the grass filter area. A sediment trap should be constructed between the wash pad and the grass filter to collect solids and keep them out of the filter area.

When the treatment/dispersal area is located away from the wash pad, a drain with a 4-inch diameter pipe to carry the wash water to the treatment/dispersal area is recommended. A grate to trap hair and solids may be necessary to prevent the pipe from plugging or accumulating in the treatment area.

Use a distribution device such as gated irrigation pipe or 4-inch PVC pipe with 1-inch holes uniformly spaced to distribute the wash water across the width of the grass filter. For optimal distribution, bore holes in the pipe at the 10 or 4 o‘clock position.

Design Criteria for the Grass Filter

The grass filter should have a 3:1, 4:1 or 5:1 length to width aspect ratio. The filter should be level across the width so flow is evenly spread over the area. Both sides and the upslope end of the filter should be bordered by a berm of at least 8 inches to divert surface flow away from the filter and to retain wash water flow in the containment area for proper treatment. The surface slope along the length of the filter should be 0.3 to 0.6 percent (0.3 to 0.6 foot of drop in 100 feet of length). See *Figure 2*.

The filter should be sized based on infiltrating no more than 0.2 inch of depth per day (0.125 gallons per square foot). This means 800 square feet of grass filter for every 100 gallons of daily waste flow. *Table 1* provides an estimate of filter area required based on weekly wash time using a garden hose.

Suitable perennial grass should be established and maintained within the grass filter. Consult your local K-State Research and Extension or Natural Resources Conservation Service (NRCS) office for grass selection and seed sources.
The grass filter area should be maintained with a dense stand of grass cover. Hay or mow as needed to remove excess vegetation with nutrients. Be careful to maintain a minimum grass height of 4 inches.

Animals, equipment, and vehicles can damage the grass cover or create ruts in the surface. Therefore fence livestock out and protect the filter from farm equipment and vehicle traffic.

Wastewater from sources other than the wash pad (such as kennels or pens) should not be applied to the grass filter area. Solids that accumulate in the filter area can damage the grass cover and should be removed. Reseed as needed.

Design Criteria for the Wetland Absorption Cell

A wetland cell should be constructed with a raised edge or berm so all wastewater plus rainfall entering the treatment/dispersal area is retained and surface runoff from outside is diverted away from the wetland. The bottom and sides of the wetland cell should be compacted to reduce excessive water loss from the cell.

The design load rate for summer, May through October, for rain plus wash water, should be at least 0.4 inches per day (0.25 gallons per square foot) or 100 gallons of daily flow for each 400 square feet treatment area. *Table 2* provides an estimate of the size of wetland area required based on wash time using a garden hose.

The treatment cell must be at least as large as the wash pad. Cell depth should be 12 to 18 inches. See *Figure 3*. Animals and equipment can damage the wetland plants or the treatment cell. Therefore fence it to keep livestock and machinery out. Remember, these wetland systems treat wastewater. Plants grown for human use should never be used.

When planting a wetland, use at least three different species of plants to help ensure one will grow successfully. A recommended combination is arrowheads, bulrushes/rushes and sedges. Space the plants according to recommendations for the particular species. See *Table 3* for a list of plant species.

If no instructions are available, maintain at least 1 foot of spacing in all directions and 18 to 20 inches for larger species. Plants can be

obtained from the wild, local nurseries, or by mail order.

Additional information on plants is available from the local county or district K-State Research and Extension office.

Always wear rubber gloves to protect against possible diseases when "gardening" in a wetland that receives wastewater. Thoroughly wash all skin or clothing that has come in contact with the wastewater. Promptly treat any open cuts with antiseptic. For more information on wetlands, refer to K-State publications *Rock-Plant Filter Design and Construction for Home Wastewater Systems*, MF-2340 and *Rock-Plant Filter Operation, Maintenance, and Repair*, MF-2337.

Table 1.

Grass Filter Sizes for Wastewater Treatment

Total Grooming Time/Week (minutes)	Estimated Water Use** (gallons)	(cu ft)	Minimum^ Filter Area (sq ft)	Dimensions of Filter Area (ft by ft) 3:1 Ratio 3 Length(ft)	1 Width(ft)	4:1 Ratio 4 Length(ft)	1 Width(ft)
10	50	6.7	134	20	7	23	6
20	100	13.4	267	28	9	33	8
40	200	26.7	534	40	13	46	12
60	300	40.1	801	49	16	57	14
80	400	53.4	1068	57	19	65	16
100	500	66.8	1335	63	21	73	18
120	600	80.1	1602	69	23	80	20
140	700	93.5	1869	75	25	86	22
160	800	106.8	2136	80	27	92	23
180	900	120.2	2403	85	28	98	25
200	1000	133.5	2670	90	30	103	26

** Estimated water use based on rate of 5 gpm typical for a garden hose.

^ Area based on loading application not to exceed 3 days per week of 0.2 inch/dose

Table 2.

Submerged Wetland Filter Sizes for Wastewater Treatment

Total Grooming Time/Week (minutes)	Estimated Water Use** (gallons)	(cu ft)	Maximum^ Filter Area (sq ft)	Dimensions of Filter Area (ft by ft) 1:1 Ratio 1 Length(ft)	1 Width(ft)	2:1 Ratio 2 Length(ft)	1 Width(ft)
10	50	6.7	38	6	6	9	4
20	100	13.4	76	9	9	12	6
40	200	26.7	153	12	12	17	9
60	300	40.1	229	15	15	21	11
80	400	53.4	305	17	17	25	12
100	500	66.8	381	20	20	28	14
120	600	80.1	458	21	21	30	15
140	700	93.5	534	23	23	33	16
160	800	106.8	610	25	25	35	17
180	900	120.2	687	26	26	37	19
200	1000	133.5	763	28	28	39	20

** Estimated water use based on a rate of 5 gpm typical for a garden hose.

^ Maximum wetland filter area based on a loading application of at least 0.3 inches per day.

Table 3. **Plant Species Suitable for Rock-Plant Filters**

Common Names	Botanical Name	Height (feet)	Root Depth (inches)
Arrow Arum, Tuckahoe	*Peltrandra virginica*	3.3	8–15
Arrowhead, Duck Corn	*Sagittaria sagittifolia*	2	
Arrowhead, Duck-potato	*Sagittaria latifolia*	0.5–2	10–12
Blue Water Iris, Blue Flag, Wild Iris	*Iris versicolor*		
Bog Arum, Water Arum, Wild Calla	*Calla palustris*	0.5–0.75	9–10
Bull Rush, Bulrush	*Scripus americanus*		12
Calla Lily, Common Calla	*Zantedeschia aethiopica*		
Canna Lily	*Canna flaccida*	1.3–5.9	10–12
Cattail, Broad-leaf	*Typha latifolia*	3–6	6–12 Invasive
Cattail, Narrow-leaf	*Typha angustifolia*		6–12 Invasive
Chairmaker's Bulrush	*Acorus americanus*		
Cyperus Sedge	*Carex pseudocyperus*	2.6	
Elephant Ear	*Calocasia esculentia*		
Flowering Rush	*Butomus umbellatus*	2–3	12–24
Giant Reed	*Phragmites australis*		18 Very invasive
Great Blue Lobelia	*Lobelia siphilitica*		
Japanese Water Iris	*Iris laevigata*	2.6	
Pickerel Weed	*Pontederia cordata*	0.8–4.9	15
Plantain Lily	*Hosta species*	0.5–4	
Rushes	*Juncus species*	0.5–6	
Rushes	*Scirpus species*	3–4	
Sedges	*Carex species*		
Soft Rush	*Juncus effusus*	1.5–2.5	
Umbrella Sedges	*Cyperus species*		

Figure 1. **Cross Section of wash pad**

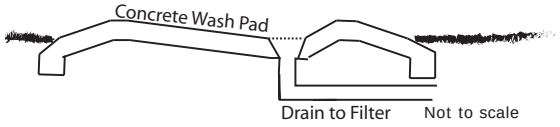


Figure 2. **Plan view of wash pad and grass filter**

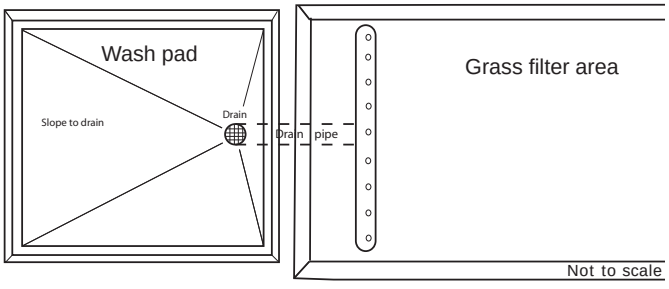
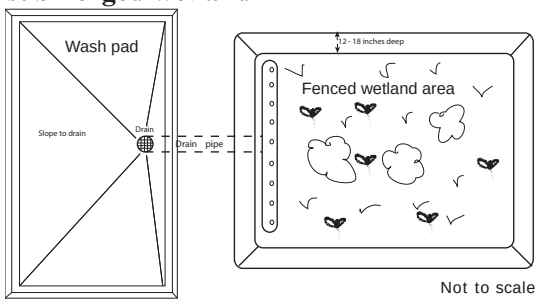


Figure 3. **Plan view of wash pad and submerged wetland**



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