Animal Waste Management Plan

September 2007

Buhler Farms

Operated by:

Name	Tracy Buhler
Address	5396 Enterprise Road, Dallas, OR 97338
Phone	503-623-0665
County	Polk

Operation:

Broiler Chicken Facility
Large Federal CAFO

As owner and operator of Buhler Farms, I intend to manage in accordance with the practices described in this Animal Waste Management Plan.

Signature Tracy W Buhler Date 9-19-07

MA #: 174533
Plan # 07129
Review by: 11/3/2007
Approved: 9/20/2007

ANIMAL WASTE MANAGEMENT PLAN
Amendment to Item 2(g)(i) – Animal Mortalities

Below is an amendment for my existing Animal Waste Management Plan (AWMP) on file with the Oregon Department of Agriculture (ODA):

In the case of an Avian Influenza outbreak in the state of Oregon, all animal mortalities will be disposed of in a manner that will comply with the Avian Influenza Surveillance and Response Plan for domestic birds developed by the Oregon Department of Agriculture.

All animal mortalities effected (directly or indirectly) by Avian Influenza will be composted in existing chicken growing barns (fryer birds) or on the facility (egg operations). The composting process will be done under the direction and in cooperation with the ODA divisions of Natural Resources and Animal Health and Identification. The composted manure/mortalities will be handled as manure and in a manner that complies with my current AWMP.

Disposal of the animal mortalities following this amendment is in compliance with the Confined Animal Feeding Operation Permit and the approved AWMP for this facility.

Facility Name: Buhler Farms

Operator's Name: Tracy Buhler

Operator's Signature: Barbara L. Buhler

Date: 9-18-07

Office Use Only:
MA#: 174533
AWMP # 07129
Status: (Accepted)/Rejected
Date: 9-21-07

GENERAL NARRATIVE DESCRIPTION

Buhler Farms is located at 5396 Enterprise Road, Dallas, OR, 97338, near Dallas, Oregon and is owned by Clarence and Tracy Buhler (father and son). The operation is a broiler chicken facility in Polk County. The facility is typically in operation year round. Chicks are received from the hatchery in broods up to approximately 175,500 for the 40 to 45 day grow out period. There are typically six to seven grow out periods per year. The average weight per chicken is estimated for manure volume as approximately 3 pounds. The finished weight is 5 to 5.5 pounds per chicken. All manure and litter is collected, composted, and exported from the farm. No land application of manure occurs.

Manure Collection Methods

The chickens are raised in six poultry houses (two that are 60' x 500', two that are 45' x 400', one that is 36' x 450', and one that is 42' x 400'), which are designed for loose housing using sawdust for bedding. All manure is contained within the houses while the chickens are at the facilities. In between grow out periods, manure is skimmed from each of the houses and stored in covered, dry sheds prior to exporting. A complete clean out of the barns occurs once a year and is stored in the covered, dry sheds until it can be exported.

Manure Storage Facilities and Transfer

The manure generated at the facility is handled in a dry solid form. Dry manure is skimmed from each of the houses using a front-end loader and transferred to the covered dry storage areas (100' x 60', 40' x 60', 48' x 250'). All manure is stored in the covered dry sheds. The manure storage areas are cleaned to prevent runoff.

Manure Utilization

Once during the year, one hundred percent of the manure is hauled off the farm.

Land Application Areas

All manure is exported off the farm.

Manure and Waste Volumes

Calculated volumes of all manure, bedding, have been completed using the Oregon Animal Waste Management Worksheet (ORAWM) based from the NRCS Agricultural Waste Field Handbook. The worksheet is included in this Animal Waste Management Plan.

Nutrient Content of Manure and Litter

The same worksheet was used to estimate the nutrient content of the manure. The farm will annually test the manure/litter and make the information available to customers.

Farm Nutrient Balance

All manure is exported off the farm.

Application Schedule and Limitations

All manure is exported off the farm. No manure is applied to fields on the farm.

Animal Mortality Management

Animal mortalities are composted within the manure storage buildings. Once composted, the manure is exported.

Record Keeping and Reporting

Soil samples are not required for this facility. A manure sample will be taken annually to provide customers with nutrient content. Protocol for sampling manure is included in this Animal Waste Management Plan.

Buhler Farms records the date and amount of manure exported to their customers. As a Large Federal CAFO, the following inspections will occur and records kept:

	FREQUENCY OF INSPECTIONS	ITEM(S) TO BE INSPECTED
INSPECTIONS:	DAILY	❑ Water lines
	WEEKLY	❑ Storm water diversions ❑ Run-off diversions ❑ Waste transport ❑ Storage structures ❑ Storage structure volume
	PERIODIC	❑ Application equipment leaks

Record results of:

1. Daily inspections.
2. Weekly inspections.
3. Periodic inspections.
4. Corrective actions taken, explain those not corrected.
5. Total amount of manure transferred to other persons, including date and amount of each transfer and the name and address of each recipient. Nutrient content data will be given to the recipient.

Buhler Farms will report any discharge within 24 hours to the Oregon Department of Agriculture. Annual reports including amount of manure applied and exported will be submitted each year.

Protocol for Sampling Manure

Solid manure compost will be sampled and tested prior to manure exports in the spring. Approximately 20 small grab samples from the manure pile will be

taken to make one composite sample. After collection, the grab samples will be thoroughly mixed. About one quart of manure will be removed for nutrient analysis. The sample will be preserved for shipping to an analytical laboratory and tested for Total Nitrogen (TKN), Ammonium Nitrogen (NH4-N), Phosphorus (P), Potassium (K), and moisture content (or dry matter).

ANIMAL WASTE MANAGEMENT PLAN
MINIMUM REQUIRED ELEMENT

Operation and Maintenance

Buhler Farms
Name of Operation

Mark all that apply to your operation.

☐ Above and/or Below Ground Liquid Tank

The tank serves as a collection point for effluent to drain to or be scraped from the animal feeding areas. If the tank will provide storage capacity to the waste management system it shall be completely emptied at the beginning of the storage period and the contents applied to cropland as weather and crop conditions permit. A 1-foot free board will be maintained to prevent spillage. Continually maintain all pumps, agitators, piping valves and all other electrical and mechanical equipment in good operating condition by following manufacturer's recommendations. Float valves will be maintained in good working order. Perform daily inspections of waterlines including drinking water or cooling water lines. Repair leaking lines immediately to prevent excess water from entering the waste storage system. Depth markers are installed to assure maximum volume will be maintained and checked weekly. At least once every 5 years, the tank shall be emptied and inspected for structural damage and leakage. Any damage found shall be corrected before putting the tank back in service. Remove all foreign debris within the structure that may cause damage to pumps and agitator. If below ground, the tank lid will not be subjected to more than two, 8,000 pound wheel loads. Before entering a tank, for any reason whatever, proper ventilation shall be provided, and self-contained breathing apparatus shall be used, if required, when entering a covered tank. No one shall enter the tank unless safety ropes are used and someone else capable of providing assistance is outside of the tank. Warning: Entering Unventilated Tanks Is Extremely Dangerous.

☐ Animal Access Lanes or Walkways

Damaged components will be repaired or replaced as needed. Debris and excess manure will be removed from roadway surfaces, road ditch and drainage areas. Maintain drainage area capacities. Maintain good vegetative cover on all slopes and watercourses.

☐ Agitator

Preventative maintenance will be in accordance with the manufacturer's recommendations. Periodically examine the agitator for proper operation. Clean debris from the propeller and promptly replace any defective or damaged parts. Remove the agitator from the manure tank or pond and periodically clean and oil as needed to increase the life expectancy of the agitator. Immediately repair any vandalism or livestock damage. Do not allow livestock near the equipment during operation.

☐ Concrete Gutters
Floor gutters and grates will be inspected periodically. All foreign material restricting flow will be removed. Damage will be repaired as needed.

☐ Curbs
Curbs, gutters and slabs that are used to convey effluent to the below ground tank will be inspected periodically. Broken sections will be repaired or replaced. Manure or other solids will be prevented from building up next to curbs or flowing over them. If over flow is a consistent problem the curb height should be increased.

☒ Culverts
Inspect annually or after large rainfall event. All foreign objects restricting water flow will be removed. Damaged sections will be repaired or replaced. Erosion around inlet or outlet will be corrected.

☒ Dry Stack Storage Facility
Solid manure storage facility will be inspected annually. Broken slabs and curbs will be repaired. Repair or replace rusted or damaged areas on roof structure. Broken gutters and/or downspouts will be repaired or replaced. Check for adequacy and function of drain away from downspouts. Check side and back walls for soundness.

☐ Fencing
Fences will be inspected periodically. Broken or decayed posts will be replaced. Sagging wire will be tightened. Broken wire will be spliced or replaced. Broken or missing insulators for electric fencing will be replaced. Vegetation will be controlled under the fences.

☐ Filter Strips
Maintain vigorous growth of vegetative covering. This includes reseeding, fertilization and application of herbicides when necessary. Periodic mowing, harvesting or grazing may also be needed to control height. Remove all foreign debris that hinders system operation. Limit the traffic from filter strip area. Limit livestock usage to vegetative growth periods when the animals will not damage vegetative root system or compact the soil. Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage.

☒ Gutters and Downspouts
Gutters will be inspected annually to ensure all gutters are free of foreign materials. Broken gutters or downspouts will be replaced or repaired. Gutters will be connected to downspouts. Leaky gutters and downspouts will be repaired. Weeds and sediment will be removed from downspout outlets. All downspouts will be connected to outlets, which are kept free flowing. Outlets will be inspected for rodent guards and repaired or replaced as needed.

❑ Manure Application Equipment

All manure application equipment (including but not limited to sprinklers, big gun irrigators, spreaders and/or tank wagons) will be operated and maintained according to the manufacturer's manual. Equipment found to be broken or worn will be replaced. Equipment will be calibrated to ensure recommended rates are applied. Liquids will be drained from sprinklers or big guns prior to freezing weather. When system is flushed, rinse water is used following waste, and liquid and sediment is applied agronomically. Nozzles will be checked periodically and if worn, nozzles will be replaced. Minimize exposure to animal and organic waters and manure gasses. Wear protective clothing when appropriate. When cleaning equipment after nutrient application, remove and save wastes in an appropriate manner. Avoid applying manure near surface water and use extreme care to avoid contaminating ground water.

❑ Manure Effluent and Irrigation Transfer Lines.

Manure, effluent and irrigation lines shall be flushed with clean water periodically to prevent particle buildup and plugging. Manure flushed from the lines will be applied agronomically so that surface and groundwater will be protected. Manure, effluent and irrigation lines shall be inspected periodically for leaks or worn out nozzles, and repairs or replacements made as needed. Special inspection shall be done to pressure relief valves, risers and control valves. Shut off valves will be inspected annually. Avoid unnecessary travel over pipelines that will damage their integrity. Equipment found to be broken or worn will be replaced. Water will be drained during cold weather to prevent frozen or broken lines. These lines can explode if not properly maintained and may cause human injury.

❑ Pumps

Pumps will be maintained in accordance with manufacturer's operation and maintenance manual. Effluent will be drained from pumps prior to freezing weather. Pumps will be inspected periodically to identify and remove debris wrapped around impeller or worn parts. Appropriate action will be taken to repair any worn parts. Liquids will be drained from pump prior to freezing weather to prevent breakage. It is recommended to have a spare pump or back up system in case a pump must be removed for an extended time for repair.

☒ Roofs

Roofs will be inspected annually. Rusted sections will be replaced or repaired if needed. Loose sections will be secured. All broken trusses, beams, poles, gutters and downspouts will be repaired or replaced.

❑ Solid Manure Separator

The separator should be inspected regularly for deterioration of protective coatings and repaired as necessary. All plumbing will be inspected annually and broken lines will be replaced or repaired. Loose connections will be tightened. If applicable, electric motors, pumps and gears should be routinely maintained. Separator will be operated and maintained according to manufacturer's manual.

☐ Trough or Tank

Watering facility will be inspected periodically. Damaged tank/trough will be repaired or replaced. Float valves will be maintained in good working order. Area immediately surrounding the trough/tank will be maintained in a stable condition.

☐ Waste Storage Pond

Prior to the storage season, empty the pond to provide storage capacity for the accumulation of wastewater and precipitation during the winter storage period. Sludge and accumulated solids will be removed from the pond periodically when buildup limits storage capacity in the pond. Depth markers are installed to assure maximum volume will be maintained and checked weekly. A 2-foot free board will be maintained to prevent spillage.

Maintain all pumps, agitators, pipeline, valves, and electrical and mechanical equipment in good operating condition following the manufacturer's recommendations. Immediately repair any vandalism, vehicular, or livestock damage to any earth fill. Immediately remove any obstructions or blockage of spillways, trash racks or pipe inlets. Settlement or cracks in earthen sections should be investigated to determine cause and immediately repaired. Maintain vigorous growth of vegetative coverings on the dikes to eliminate soil erosion. Eradicate or otherwise remove all rodents or burrowing animals and repair any damage caused by their activity. Fences and/or warning signs should be maintained as necessary to unauthorized human or livestock entry. Operate systems in a manner that minimizes odor and drift.

Signature of Legally Authorized Representative: Tracy W Buhler

Print Name: Tracy W Buhler Date: 9-19-07

ANIMAL WASTE SAMPLING

Animal waste analysis is a key component of nutrient management. Complete analyses provide critical information about the animal waste composition, including pH and nutrient content. Actual nutrient content of animal waste varies with the type of animal, feed, storage system, and method of animal waste application. You should sample animal waste stored on site each time it is to be removed (for land application on or off site). Sample daily spread operations (if you land-apply daily) several times throughout the year to obtain a good estimate of nutrient content.

Description

Animal waste sampling is relatively simple, but must be done properly for reliable results. The sampling method differs based on the type of animal waste you generate at your farm (e.g., liquid, semi-solid, solid). Animal waste sampling generally consists of two to seven steps, depending on the type of animal waste. Although the number of steps varies based on the physical state of the animal waste, all of the methods rely on collecting a representative animal waste sample for analysis. Where bedding is collected with the animal waste, include both bedding and animal waste in the sample. Also, conduct sampling as close to the time of land application as possible. Specific techniques for gathering poultry litter, liquid animal waste, semi-solid animal waste, and solid animal waste samples are described below; you can use these to help develop sampling procedures at your farm. Remember that you should sample and analyze all animal waste at your farm. Work with your state and local agricultural Cooperative Extension Offices to ensure that you develop the proper procedures for your conditions and animal waste management methods.

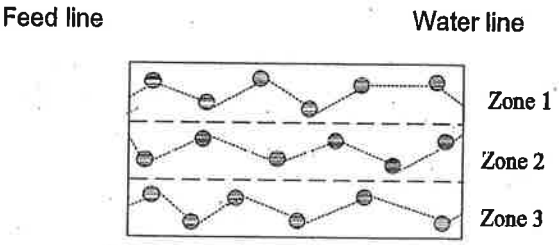
Before sampling, know where the samples are to be shipped, how to pack and ship the sample, and what to use as sample containers. Many laboratories will furnish the proper sample containers for a small charge. Samples should never be collected and shipped in glass bottles, and they should be shipped on wet ice unless otherwise instructed by the laboratory. Contact your state or local agricultural Cooperative Extension Office for a list of laboratories that can perform your analyses. You should also wear gloves at all times, to protect yourself and the sample from contamination.

The test should analyze for such parameters as percentage of dry matter, ammonium-nitrogen, total-nitrogen, phosphorus (P or P_2O_5), and potassium (K or K_2O). Request results in the same units as your calibrated animal waste application system (see Appendix J for more information about calibrating animal waste spreaders and irrigators). For example, if your animal waste application is measured in tons per acre, request that your analysis be reported as pounds of nutrient per ton of animal waste.

Instructions for Collecting Poultry Litter Samples

Poultry litter is a mixture of poultry animal waste and the bedding (e.g., sawdust or rice hull) from houses used to raise broilers, turkeys, and other birds. You will need a clean 5-gallon bucket, a narrow, square-ended spade (or a soil spade), and a 1-quart plastic freezer bag to collect and store your sample. The five steps to collecting a representative poultry litter sample are described below.

Step 1: Mentally divide the poultry house into three zones of equal size. Within each zone, you'll take six cores (i.e., samples) as shown in the diagram below.



Sampling Pattern for Poultry Houses

Step 2: Take the first core within 1 foot of the feed line using your spade. Clear a small trench the width of the spade to the depth of the litter and remove a 1-inch slice, making sure to get equal amounts of litter from all depths. Empty the sample into your bucket.

Step 3: Repeat the process, gathering six cores from each zone, taking your last core within each zone within 1 foot of the water line. Walk the length of the building in each zone in a zigzag pattern taking cores with the spade at random points along your path (as shown in the diagram above). Take a representative number of cores under feeders and waterers. If the bucket becomes full before all 18 samples are taken, dump the contents onto a plastic sheet and continue sampling.

Step 4: After collecting samples from all three zones, crumble and thoroughly mix all of the litter in the bucket. It may be easier to pour the material onto a piece of plastic, or plywood, or into a wheelbarrow to facilitate mixing. Thorough mixing is critical to ensure that the analyzed sample is representative of the entire house.

Step 5: After the litter is well mixed, fill your plastic freezer bag with a subsample (i.e., a small sample) from your composite. Fill the bag only two-thirds full and squeeze the air out before sealing. Keep the sample cool (on ice if possible) until it is shipped.

Instructions for Collecting Liquid Animal Waste Samples

Liquid animal waste is typically stored in tanks, lagoons, or ponds. For tanks, collect only one sample, but collect several subsamples of liquid animal waste to get a representative sample from lagoons and ponds. You will need a clean 5-gallon bucket, a plastic cup, wire, and a long pole to collect liquid animal waste samples from lagoons and ponds. Sample containers are required to collect liquid animal waste samples from all sources. The two steps to collect a representative liquid animal waste sample are described below.

Step 1: For lagoons and ponds, collect several samples from around the shore of the lagoon or pond and mix them together in a clean 5-gallon bucket. You can collect the samples by wiring a plastic cup to the end of a long pole. When taking the sample, turn the cup upside down and push it a few feet below the surface. Then turn the cup right side up and pull out the sample.

If you store your liquid waste in tanks, your tanks must be well agitated before sampling. Often the only practical time to do this is as you are pumping the animal waste into your spreader.

Step 2: Fill a sample container with your sample, making sure to leave 2 inches of air space. Tightly seal the container and keep cool (on ice if possible) until it is shipped.

through the tubing and slide in a dowel or short metal rod to make a handle. Cut a 4-foot length of broomstick to force samples from the tube.

Step 2: Push and twist the tubing all of the way into the animal waste pile. Use the broomstick to push the animal waste into a clean 5-gallon bucket.

Step 3: Repeat Step 2 at several random locations around the pile. It is recommended that the more samples the better, so try to get at least 20 samples.

Step 4: Mix samples in the 5-gallon bucket, and fill the sample container with the mix, leaving 2 inches of air space. Tightly seal the container and keep the sample cool (on ice if possible) until it is shipped.

Animal Waste Sample Analyses

Contact your state or local agricultural Cooperative Extension Office for a list of available laboratories that can analyze your animal waste samples. Some Cooperative Extension Offices may even provide free analysis (e.g., in Maryland).

Label, package, and ship your samples to your contracted laboratory. The laboratory should be able to provide their proper protocol for packaging and shipping samples.

Your animal waste sample is typically analyzed for the following constituents:

- Nitrogen;
- Phosphorus;
- Potassium;
- pH;
- Moisture content;
- Calcium;
- Manganese;
- Magnesium;
- Sulfur;
- Zinc; and
- Copper.

The first step in interpreting analytical results of an animal waste test is to check the units used to report the results. They may be reported as percent nutrient (%) or parts per million (ppm), or, on rare occasions, on a dry-weight basis. (Most animal waste is measured on a wet-weight [i.e., as-is] basis.) The phosphorus and potassium may be reported on an elemental basis (P and K) rather than the phosphate (P_2O_5) and potash (K_2O) basis, which is typical of fertilizers. You will need to convert your animal waste test results into the proper fertilizer units for calculating your animal waste application rate.

Animal waste is an excellent fertilizer if it is spread uniformly on a field and at the proper rate. A pound of animal waste phosphate or potash has a nutrient value equivalent to that of commercial fertilizer. Although it has a value as a fertilizer, typically 50 to 80% of the total nitrogen applied is available to crops.

Instructions for Collecting Semi-Solid Animal Waste Samples

Collecting a representative sample of semi-solid animal waste is best done using a simple sampling device. You will need a 2-inch PVC pipe, nylon rope, a rubber ball, a dowel, a clean 5-gallon bucket, and sample containers. The seven steps to collecting a representative semi-solid animal waste sample are described below.

Step 1: Get a length of 2-inch PVC pipe long enough to reach well into your animal waste storage facility. Cut a notch 2 inches long and 1/4 inch wide at one end of the pipe. Cut a length of nylon rope 2 feet longer than the PVC pipe and tie a knot at one end. Drill a hole through a 2.5 inch rubber ball. Thread the rope through the ball until it is snug against the end knot. Tie a second knot to hold the ball at the end of the rope. Thread the rope through the PVC pipe and pull it until the ball plugs the end of the pipe. Slip your end of the rope into the notch and tie a knot; this will create a "latch" to keep the pipe sealed after you collect the sample. Tie a short dowel to the free end of the rope to serve as a hand grip. Cut a length of 1-inch PVC pipe and seal one end. Use this pipe to push samples out of the tube.

Step 2: With the ball sealing the end of the pipe, push the pipe through the top layer of animal waste to form a sample hole.

Step 3: Release the rope from the notch so that the ball dangles freely from the end of the pipe. Push the pipe into the sample hole in the animal waste crust. Make sure the ball does not block the pipe opening.

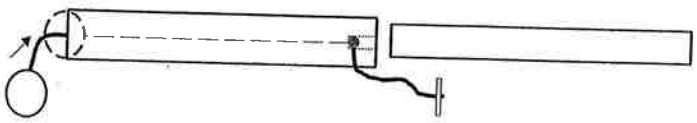
Step 4: Ease the pipe back slightly and pull the rope until the ball seals the end of the pipe. Slip the rope in the notch to anchor the ball in place and withdraw the pipe.

Step 5: Pour the sample into a clean 5-gallon bucket. You may need the 1-inch PVC pipe to force the sample from the pipe. Two people will need to operate a long pipe. To avoid backwash, keep the bottom of the pipe lower than your end.

Step 6: Repeat this process at several locations around the pit.

Step 7: Mix samples thoroughly in the bucket, then fill your sample container with the mix, leaving 2 inches of air space. Tightly seal the container and keep the sample cool (on ice if possible) until it is shipped.

A diagram of the sampling apparatus is shown below.



Sample Apparatus for Semi-Solid Animal Waste

Instructions for Collecting Solid Animal waste

Collecting a representative sample of solid animal waste is best done using a simple sampling device. You will need thin-walled metal tubing (1-inch diameter), a drill, a dowel or short metal rod, a clean 5-gallon bucket, and sample containers. The four steps to collecting a representative solid animal waste sample are described below.

Step 1: Cut a 3-foot length of thin-walled metal tubing and sharpen the bottom edge. Near one end, drill

References

MU Extension, University of Missouri-Columbia. Sampling Poultry Litter for Nutrient Testing.

Cooperative Extension Service, University of Maryland System. Manure Analysis Instruction Sheets.

Who to Contact For More Information

Your Local Cooperative Cooperative Extension Office
Your Local Land Grant University
National Water Management Center/Natural Resources Conservation Service (USDA)

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET

Version HRv3.0

9519507
STATE: OREGON

CLIENT: Buhler Farms
ASSISTED BY: ODA
CHECKED BY: CMT

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

ANIMAL INVENTORY

Type of Animal	Number of Animals	Average Weight (lbs.)	Animal Units (1,000 lb.)	Nutrient Production (lbs./day/1000 lb. Animal Unit) N	P	K	Nutrient Production (lbs./day) N	P	K	Manure CF/D/AU	Annual Days Confined	Annual Days Grazed
CHICKEN(BROILER)	175,000	3	525.0	0.97	0.28	0.55	509.25	147.00	288.75	1.37	318	47
Totals/Averages-	175,000	3	525.0	0.97	0.28	0.55	509.3	147.0	288.8	1.4		

GRAZING PERIOD

Type of Animal	Percent of Month and Number of Animals Grazing OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AU-YR.
	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	
CHICKEN(BROILER)	175000	175000	175000	175000	175000	175000	175000	175000	175000	175000	175000	175000	819
													0
													0
													0
													0
													0
													0
													0
													0
													0
Total AUM's Available>	0	0	0	0	0	0	0	0	0	0	0	0	0
Total AUM's Needed>>>	68	68	68	68	68	68	68	68	68	68	68	68	819
Total AUM's>>>>>>>>>>	-68	-68	-68	-68	-68	-68	-68	-68	-68	-68	-68	-68	-819

U.S. Department of Agriculture
Natural Resources Conservation Service

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9519507
STATE: OREGON

CLIENT: Buhler Farms
ASSISTED BY: ODA
CHECKED BY: CMT

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

WEATHER STATION: DALLAS 2 NE

Month	25Yr-24Hr: 5.50 Monthly Average in Inches – Precipitation	Evaporation	Lot Runoff Factors as a Percent of Monthly Precipitation – Paved	Unpaved
October	3.25	1.53	50%	20%
November	7.64	0.66	55%	25%
December	8.63	0.57	55%	20%
January	7.59	0.68	57%	25%
February	6.26	0.90	50%	20%
March	5.27	1.23	45%	15%
April	3.21	2.01	40%	10%
May	2.23	3.11	37%	10%
June	1.41	4.01	37%	10%
July	0.50	5.20	30%	0%
August	0.67	4.76	35%	10%
September	1.44	3.22	45%	15%
Annual	48.1	27.88		

AREAS CONTRIBUTING RUNOFF TO LIQUID STORAGE FACILITY

Description of Runoff Area	Area in SF
Paved Lot Area >> Is paved lot scraped daily? (Y/N) NO	0
Unpaved Lot Area >>	0
Roof Area >>	0
Surface Area of Silage Storage Facility>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> Does Silage Seepage Drain to Storage Facility? (Y/N) NO	0
Total Runoff Area Contributing to Liquid Storage Facility>>>>>>>>>>>>>>>>	0

WATER USE THAT ENTERS LIQUID STORAGE FACILITY

Type of Water Use	Number of Animals	Number of Washes per Day	Gallons of Water Used per Wash-Day	Total Water Use per Day, Gallons	Total Water Use per Day, Cubic Feet
Animal Washwater	0.0	2	0.00	0	0.0
Equipment Wash		2	0.00	0	0.0
Flushwater		2	0.00	0	0.0
Miscellaneous		2	0.00	0	0.0
Total>>>				0	0.0

CROP DATA

Field Number	Acres	Crop	Condition	Yield Units	Target Yield	Nutrients Removed in Pounds per Acre – Nitrogen N	Phosphorous P2O5	Potassium K2O
Off-Farm								

U.S. Department of Agriculture
Natural Resources Conservation Service

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Version HRv3.0

9519507
STATE: OREGON

CLIENT: Buhler Farms

ASSISTED BY: ODA   CHECKED BY: CMT

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

BEDDING VOLUME

Type of Animal	Type of Bedding Facility	Bedding Material	Unit Weight Lbs/CF	Amount Needed Lbs/Day/AU	Volume CF/Day/AU	Total Volume CF/Day	Total Weight Lbs/Day
CHICKEN(BROILER)	Loose Housing	Sawdust	12.00	12.40	0.15	79	6,510

SOLIDS SEPARATION FACTOR

Type of Animal	Type of Separator	Separation Factor %	Volume of Solids Separated CF/Day	Volume of Solids in Liquids CF/Day	Volume of Manure in Liquids CF/Day	Volume of Manure in Solids CF/Day	Accumulated Sludge in Storage CF/Day	Density of Separated Solids Lbs/CF	Weight of Separated Solids Lbs/Day
CHICKEN(BROILER)	Dry Scrape System	100%	798	0	0	719	0	36	28,728
Total Solids>>			798	0	0	719	0		28,728

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET

Version HRv3.0

CLIENT: **Buhler Farms**
ASSISTED BY: **ODA**
CHECKED BY: **CMT**

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY VOLUMES

Month	Runoff in Cubic Feet				Facility Water Use Cubic Feet	Manure		Bedding		Solids Separated		Solids in Liquids		Total Solids	Total Liquids
	Roof Area Square Feet 0	Paved Slab Area Square Feet 0	Unpaved Lot Area Square Feet 0	Silage Pit Surface Area, SF 0		Solids Cubic Feet	Liquids Cubic Feet	Cubic Feet	Pounds	Cubic Feet	Pounds	Cubic Feet	Pounds	Cubic Feet	Cubic Feet
October	0	0	0	0	0	19,398	0	2,124	175,575	21,522	774,794	0	0	21,522	0
November	0	0	0	0	0	18,772	0	2,055	169,911	20,828	749,801	0	0	20,828	0
December	0	0	0	0	0	19,398	0	2,124	175,575	21,522	774,794	0	0	21,522	0
January	0	0	0	0	0	19,398	0	2,124	175,575	21,522	774,794	0	0	21,522	0
February	0	0	0	0	0	17,521	0	1,918	158,584	19,439	699,814	0	0	19,439	0
March	0	0	0	0	0	19,398	0	2,124	175,575	21,522	774,794	0	0	21,522	0
April	0	0	0	0	0	18,772	0	2,055	169,911	20,828	749,801	0	0	20,828	0
May	0	0	0	0	0	19,398	0	2,124	175,575	21,522	774,794	0	0	21,522	0
June	0	0	0	0	0	18,772	0	2,055	169,911	20,828	749,801	0	0	20,828	0
July	0	0	0	0	0	19,398	0	2,124	175,575	21,522	774,794	0	0	21,522	0
August	0	0	0	0	0	19,398	0	2,124	175,575	21,522	774,794	0	0	21,522	0
September	0	0	0	0	0	18,772	0	2,055	169,911	20,828	749,801	0	0	20,828	0
Annual	0	0	0	0	0	228,398	0	25,007	2,067,251	253,405	9,122,576	0	0	253,405	0

DAILY NUTRIENT PRODUCTION

Type of Animal	Pounds/Day of Nutrients from **LIQUIDS**			Pounds/Day of Nutrients from **SOLIDS**			Pounds/Day of Nutrients from **GRAZING**		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
CHICKEN(BROILER)	0.00	0.00	0.00	509.25	336.78	347.94	509.25	336.78	347.94
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MONTHLY NUTRIENT PRODUCTION

Month	Pounds of Nutrients from **LIQUIDS**			Pounds of Nutrients from **SOLIDS**			Pounds of Nutrients from **GRAZING**			Pounds of Nutrients going **OFF-FARM**			Total Pounds of Nutrients from **ALL SOURCES**		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
October	0	0	0	13,734	9,083	9,384	2,052	1,357	1,402	0	0	0	15,787	10,440	10,786
November	0	0	0	13,291	8,790	9,081	1,986	1,313	1,357	0	0	0	15,278	10,103	10,438
December	0	0	0	13,734	9,083	9,384	2,052	1,357	1,402	0	0	0	15,787	10,440	10,786
January	0	0	0	13,734	9,083	9,384	2,052	1,357	1,402	0	0	0	15,787	10,440	10,786
February	0	0	0	12,405	8,204	8,476	1,854	1,226	1,267	0	0	0	14,259	9,430	9,742
March	0	0	0	13,734	9,083	9,384	2,052	1,357	1,402	0	0	0	15,787	10,440	10,786
April	0	0	0	13,291	8,790	9,081	1,986	1,313	1,357	0	0	0	15,278	10,103	10,438
May	0	0	0	13,734	9,083	9,384	2,052	1,357	1,402	0	0	0	15,787	10,440	10,786
June	0	0	0	13,291	8,790	9,081	1,986	1,313	1,357	0	0	0	15,278	10,103	10,438
July	0	0	0	13,734	9,083	9,384	2,052	1,357	1,402	0	0	0	15,787	10,440	10,786
August	0	0	0	13,734	9,083	9,384	2,052	1,357	1,402	0	0	0	15,787	10,440	10,786
September	0	0	0	13,291	8,790	9,081	1,986	1,313	1,357	0	0	0	15,278	10,103	10,438
Annual	0	0	0	161,712	106,944	110,490	24,164	15,980	16,510	0	-1	0	185,876	122,923	126,999

TBuhler.ORAWMvHR3.0.xls

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET

Version HRv3.0

9519507
STATE: OREGON

CLIENT: **Buhler Farms**
ASSISTED BY: **ODA**

CHECKED BY: **CMT**

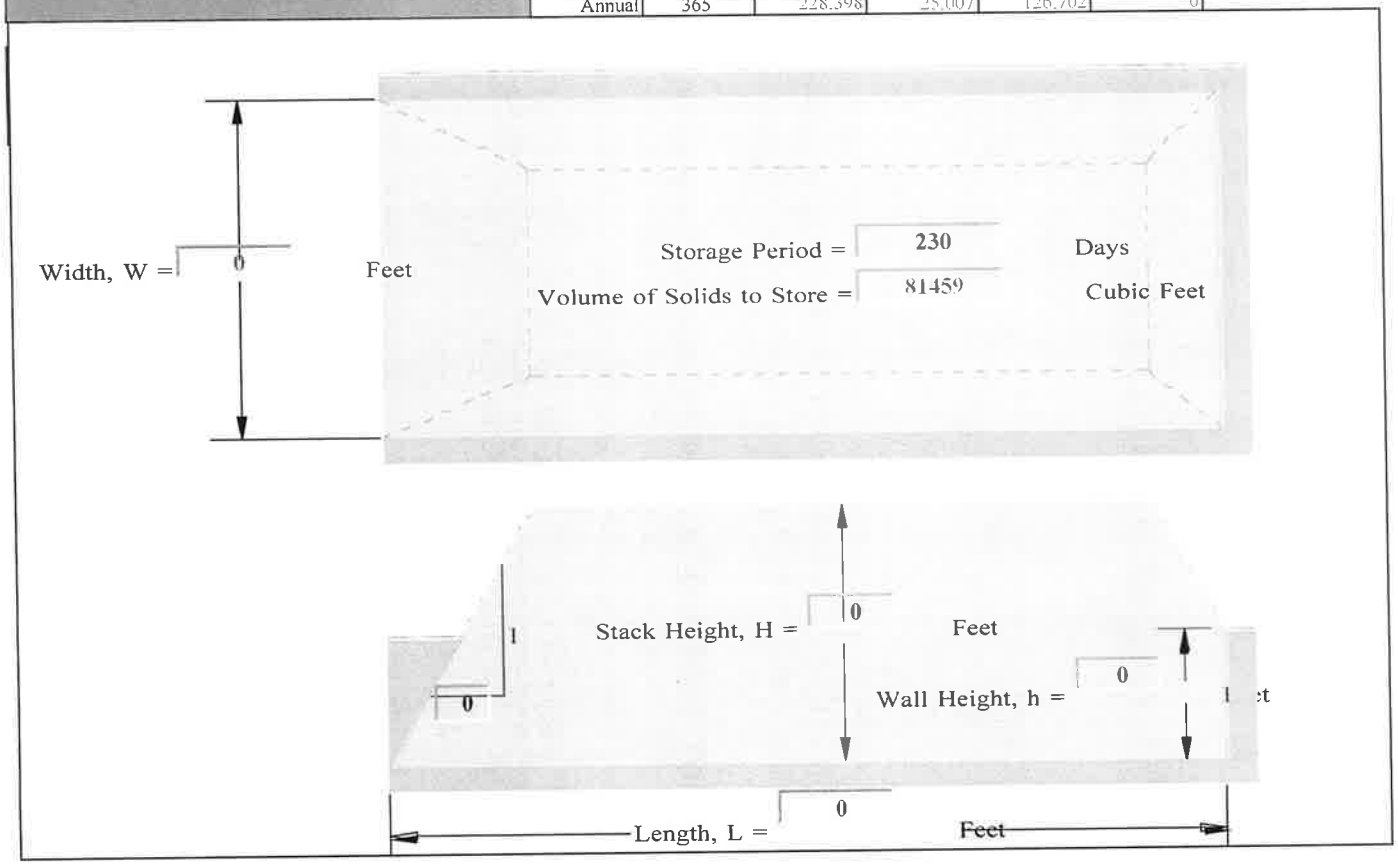
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

SOLIDS STACKING FACILITY

Solids Storage Facility Parameters	Value
Storage Period, Days=	230
Stacking Width, W in Feet=	0
Stacking Height, H in Feet=	0.00
Wall Height, h in Feet=	0.00
Stack Side Slope (X:1)=	0.00
Existing Storage, Cubic Feet=	81,600
Surface Area of Existing Storage, SF=	0
25 Year-24 Hour Storm Runoff, CF=	0
Volume Needed, Cubic Feet=	81,459
Design Volume, Cubic Feet=	0
Is Facility Covered?	YES

MONTHLY SOLIDS VOLUME STACKED IN FACILITY

Month	Number of Days	Manure CF	Bedding CF	Solids to Store CF	Normal Runoff CF
October	31	19398	2,124	10,761	0
November	30	18772	2,055	10,414	0
December	31	19398	2,124	10,761	0
January	31	19398	2,124	10,761	0
February	28	17521	1,918	9,720	0
March	31	19398	2,124	10,761	0
April	30	18772	2,055	10,414	0
May	31	19398	2,124	10,761	0
June	30	18772	2,055	10,414	0
July	31	19398	2,124	10,761	0
August	31	19398	2,124	10,761	0
September	30	18772	2,055	10,414	0
Annual	365	228,398	25,007	126,702	0



U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET

Version HRv3.0

9519507
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CHECKED BY: CMT

ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

NUTRIENTS AVAILABLE AFTER STORAGE

Nutrient Source	Type of Operation / Type of Storage Facility	Pounds of Nutrients Available N	Pounds of Nutrients Available P_2O_5	Pounds of Nutrients Available K_2O	Percent Nutrients Retained After Storage N	Percent Nutrients Retained After Storage P_2O_5	Percent Nutrients Retained After Storage K_2O	Pounds of Nutrients Retained After Storage N	Pounds of Nutrients Retained After Storage P_2O_5	Pounds of Nutrients Retained After Storage K_2O
	Poultry									
Liquids	Storage Pond (>50%) Dilution	0	0	0	25%	45%	55%	0	0	0
Solids	Solids Storage Facility (Unroofed)	161,712	106,941	110,490	55%	80%	80%	88,942	85,555	88,392
Grazing	NONE	24,164	15,980	16,510	100%	100%	100%	24,164	15,980	16,510

NUTRIENTS AVAILABLE AFTER APPLICATION

Nutrient Source	Type of Application System	Pounds of Nutrients Available N	Pounds of Nutrients Available P_2O_5	Pounds of Nutrients Available K_2O	Percent Nutrients Retained After Application N	Percent Nutrients Retained After Application P_2O_5	Percent Nutrients Retained After Application K_2O	Pounds of Nutrients Retained After Application N	Pounds of Nutrients Retained After Application P_2O_5	Pounds of Nutrients Retained After Application K_2O
Liquids	Sprinkling	0	0	0	75%	100%	100%	0	0	0
Solids	Broadcast (Incorporated 7 or more days after application)	88,942	85,555	88,392	70%	100%	100%	62,259	85,555	88,392
Grazing	Grazing	24,164	15,980	16,510	85%	100%	100%	20,539	15,980	16,510

NUTRIENTS AVAILABLE AFTER DENITRIFICATION

Nutrient Source	Location / Soil Drainage Class	Pounds of Nutrients Available N	Pounds of Nutrients Available P_2O_5	Pounds of Nutrients Available K_2O	Percent Nutrients Retained After Denitrification N	Percent Nutrients Retained After Denitrification P_2O_5	Percent Nutrients Retained After Denitrification K_2O	Pounds of Nutrients Retained After Denitrification N	Pounds of Nutrients Retained After Denitrification P_2O_5	Pounds of Nutrients Retained After Denitrification K_2O
	Between Coastal and Cascade Mountains									
Liquids	Somewhat Poorly Drained	0	0	0	80%	100%	100%	0	0	0
Solids	Somewhat Poorly Drained	62,259	85,555	88,392	80%	100%	100%	49,807	85,555	88,392
Grazing	Somewhat Poorly Drained	20,539	15,980	16,510	80%	100%	100%	16,431	15,980	16,510

PERCENT OF MANURE TO BE APPLIED TO FIELD AND UTILIZATION ACRES NEEDED BASED ON NITROGEN, N

Field Number	Acres	Crop	LIQUIDS Percent to be Applied	LIQUIDS Pounds of Nutrients to be Applied	LIQUIDS Acres Needed for Utilization of Nutrients	SOLIDS Percent to be Applied	SOLIDS Pounds of Nutrients to be Applied	SOLIDS Acres Needed for Utilization of Nutrients	GRAZING Percent to be Applied	GRAZING Pounds of Nutrients to be Applied	GRAZING Acres Needed for Utilization of Nutrients
Off-Farm			0%	0		0%	0		0%	0	
TOTALS-	0		0%	0	0	0%	0	0	0%	0	0

Source: Imagery NAIP, 2005 1 meter

Prepared By: Kathryn Higgs
Printing Date: June 28, 2007
Projection: Oregon Lambert Projection (EPSG# 2992)
Datum: North American 1983
File: Q:\Natural Resources\CAFO\Area2.mxd


Enterprise Road
Decommissioned
Replaced
Business: BUHLER FARMS
MA #: 174533
Operator: TRACY BUHLER
Facility Address: 5396 ENTERPRISE RD
County: POLK
Latitude: 45.009278
Longitude: -123.338389
Approx. Location of new barn
N
Feet
0
100
200
400
600
Prepared By: Kathryn Higgs
Printing Date: June 1, 2007
Projection: Oregon Lambert Projection (EPSG# 2992)
Datum: North American 1983
File: Q:\NaturalResources\CAFO\Template.mxd
Source: Imagery NAIP, 2005 1 meter


Enterprise
New dry storage shed
Storage
New Barn
Business: BUHLER FARMS
MA #: 174533
Operator: TRACY BUHLER
Facility Address: 5396 ENTERPRISE RD
County: POLK
Latitude: 45.009278
Longitude: -123.338389
N
Feet
0
100
200
400
600
Source: Imagery NAIP, 2005 1 meter
Prepared By: Kathryn Higgs
Printing Date: June 28, 2007
Projection: Oregon Lambert Projection (EPSG# 2992)
Datum: North American 1983
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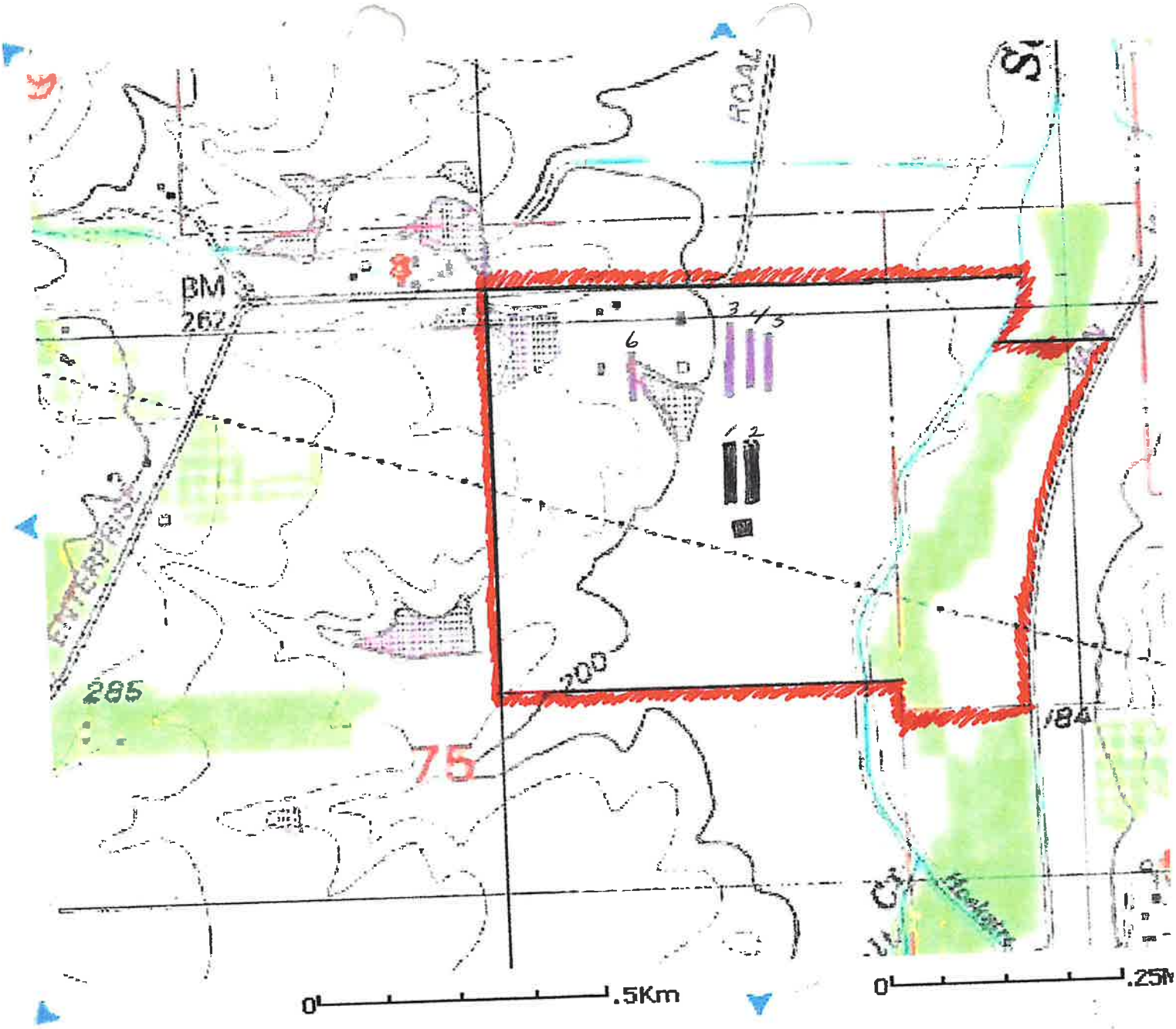


Image courtesy of the U.S. Geological Survey

Source=o45123a3 Center=(-123.3401,45.0053) 16ms Running Time

ANIMAL WASTE MANAGEMENT PLAN
Amendment to Item 2(g)(i) – Animal Mortalities

Below is an amendment for my existing Animal Waste Management Plan (AWMP) on file with the Oregon Department of Agriculture (ODA):

In the case of an Avian Influenza outbreak in the state of Oregon, all animal mortalities will be disposed of in a manner that will comply with the Avian Influenza Surveillance and Response Plan for domestic birds developed by the Oregon Department of Agriculture.

All animal mortalities effected (directly or indirectly) by Avian Influenza will be composted in existing chicken growing barns (fryer birds) or on the facility (egg operations). The composting process will be done under the direction and in cooperation with the ODA divisions of Natural Resources and Animal Health and Identification. The composted manure/mortalities will be handled as manure and in a manner that complies with my current AWMP.

Disposal of the animal mortalities following this amendment is in compliance with the Confined Animal Feeding Operation Permit and the approved AWMP for this facility.

Facility Name Buhler Farms

Operator's Name Tracy W Buhler

Operator's Signature Tracy W Buhler

Date 11-17-06

RECEIVED
NOV 20 2006
NATURAL RESOURCES DIVISION

Office Use Only:
MA#: 174533
AWMP # 05034
Status: Accepted/Rejected
Date: 11/21/06.

10/26/2006

Animal Waste Management Plan

March 2005

Received 3/15/05
AWMP # 05034
Due Date (Renew) 4/29/05

Buhler Farms

Operated by:

Name	Tracy Buhler
Address	5396 Enterprise Road, Dallas, OR 97338
Phone	503-623-0665
County	Polk

Operation:

Broiler Chicken Facility
Medium Federal CAFO

Plan was approved for 122,000, but permitted 118,000.

As owner and operator of Buhler Farms, I intend to manage in accordance with the practices described in this Animal Waste Management Plan.

Signature Tracy W Buhler Date 3-15-05

GENERAL NARRATIVE DESCRIPTION

Buhler Farms is located at 5396 Enterprise Road, Dallas, OR 97338 near Dallas, Oregon and is owned by Clarence and Tracy Buhler(father and son). The operation is a broiler chicken facility in Polk County. The facility is typically in operation year round. Chicks are received from the hatchery in broods up to 122000 for the 40 to 45 day grow out period. There are typically six to seven grow out periods per year. The average weight per chicken is estimated for manure volume as approximately 2 pounds. The finished weight is 5 to 5.5 pounds per chicken.

Manure Collection Methods

The chickens are raised in six poultry houses, which are designed for loose housing using sawdust for bedding. All manure is contained within the houses while the chickens are at the facilities. In between grow out periods, manure is removed from each of the houses and stockpiled prior to selling or spreading on farm ground.

Manure Storage Facilities and Transfer

The manure generated at the facility is handled in a dry solid form. Dry manure is skimmed from each of the houses using a front end loader and transferred to the stockpiling area. A majority, approximately 85% of the manure is sold and exported off farm. The remaining manure is applied to crop ground ~~owned~~ leased by Buhler Farms. When possible, all manure is removed from the stockpiling area in the fall of each year. Manure is covered with plastic tarps during rainy weather. The area is on high ground, which is protected from ground water. Prior to winter the stockpiling area is cleaned to prevent runoff.

Manure Utilization

Eighty-five percent of all manure is hauled off the farm, during the spring through fall. The remaining approximate 15% is spread to crop ground. Some of the manure is spread to high ground that is in permanent grass, which allows for late fall or winter applications if needed.

SPECIFIC DESCRIPTIONS AND CALCULATIONS

Land Application Areas

Aerial photos showing field locations for all manure application acreage, surface water features and headquarters are included in this Animal Waste Management Plan.

Three fields are available for manure applications. The upper Friedrick hay field is 13 acres of Suver silty clay loam, 3 to 12% slopes, which yields approximately 4 tons of grass per year. The lower Friedrick hay field is 28 acres of Helmick silt loam, 3 to 12% slopes, which yields approximately 4 tons of grass per year. Both Friedrick fields are leased from Ostraud Friedrick. The May hay field is 6 acres of 50% Woodburn silt loam,3 to 12% slopes; 25% Waldo silty loam, 0% slopes; and 25% Steiwer Silt loam, 3 to 12% slopes, which yields approximately 4 tons of grass per year. The May field is leased from Marvin May.

Manure and Waste Volumes

Calculated volumes of all manure, bedding, have been completed using the Oregon Animal Waste Management Worksheet (ORAWM) based from the NRCS Agricultural Waste Field Handbook. The worksheet is included in this Animal Waste Management Plan.

Nutrient Content of Manure, Litter and Process Waste Water

Oregon Animal Waste Management Worksheet was used to estimate volume of manure.

Farm Nutrient Balance

The amount of nutrients (N, P, K) generated, lost in storage, lost during application, used by crops and exported off of the farm is supplied for this plan using the Oregon Animal Waste Management Worksheet, included with this Animal Waste Management Plan. Buhler Farms is balancing for nitrogen, which is the most limiting nutrient as determined by the NRCS Phosphorus Index. The index shows that fields have a Site Vulnerability Class of ~~LOW~~ medium. Commercial fertilizer is applied to the crop ground to provide enough nutrients for crop yield expectations.

Application Schedule and Limitations

Manure that is applied to the 47 acres of crop ground on the farm is applied as weather permits and the crop can use the nutrients. Applications are typically made between early spring to the late fall. All manure is applied to permanent grass crops. A manure spreader is used to apply all manure. Irrigation is not required for the crops currently grown.

Naturally vegetated buffers along Salt Creek provide protection from manure applied to the fields. Buffer widths along all surface water ranges from 50 feet to over 100 feet, in some locations.

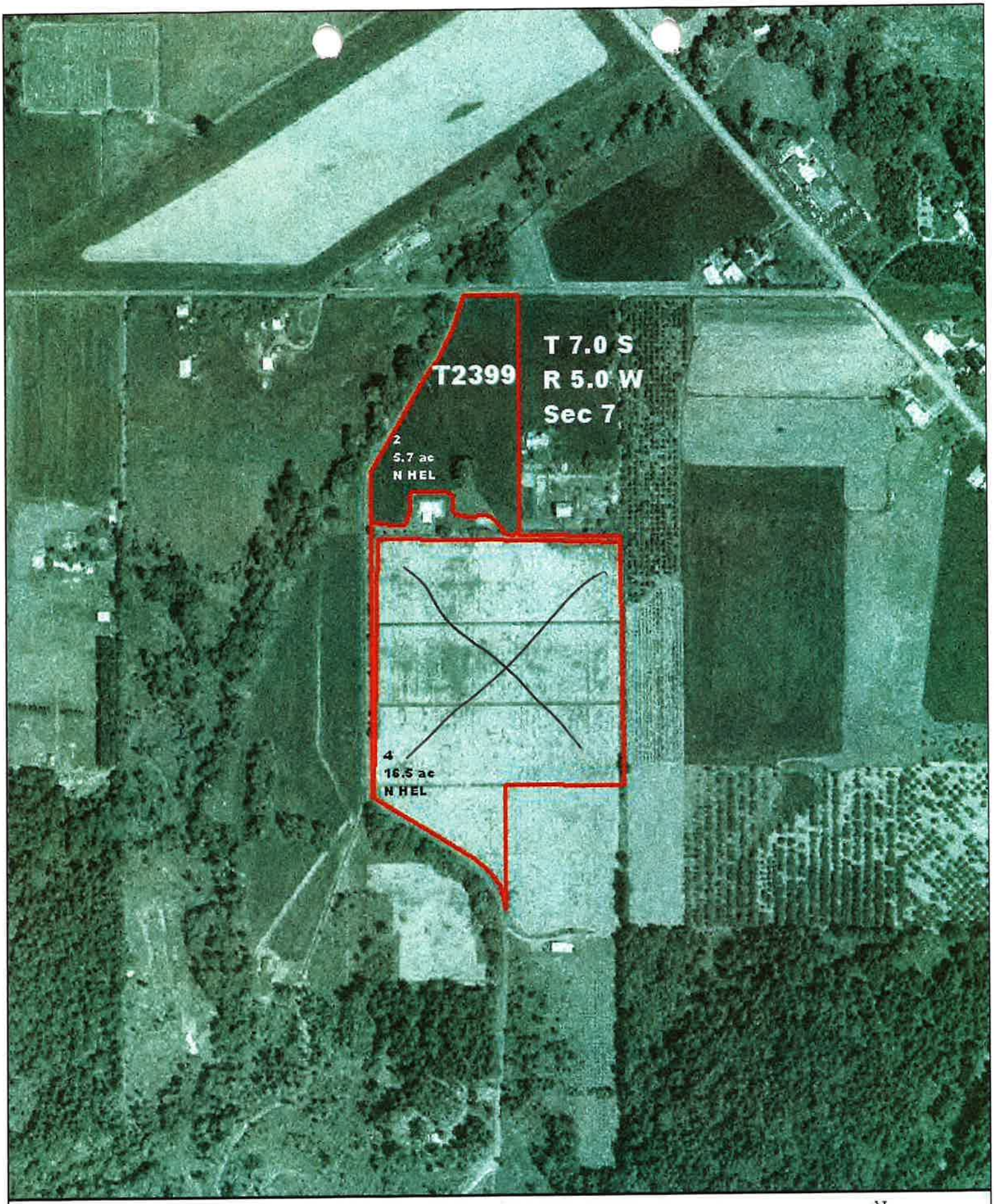
Animal Mortality Management

Animal mortalities are composted on farm using a covered compositing facility. Once composted the manure is spread on the farm ground or exported.

Record Keeping and Reporting

Soil sample test results are supplied by AgriCheck. Buhler Farms record date and amount of manure exported to their customers and accounts for manure applied to their own crop ground. Application records showing the amount of Nitrogen and Phosphorus applied will be kept.

Buhler Farms will report any discharge within 24 hours to the Oregon Department of Agriculture. Annual reports including amount of manure applied and exported will be submitted each year.


T2399
T 7.0 S
R 5.0 W
Sec 7
2
5.7 ac
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16.5 ac
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Polk County
400
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800
1200 Feet
N


T-1
10
1/23.7
2/23.3
4/4.6

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 1.8

CLIENT: Tracy Buhler

ASSISTED BY: Sarah Harshberger   CHECKED BY: Melissa Fery

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

ANIMAL INVENTORY

Type of Animal	Number of Animals	Average Weight (lbs.)	Animal Units (1,000 lb.)	Nutrient Production (lbs./day/1000 lb. Animal Unit) N	P	K	Nutrient Production (lbs./day) N	P	K	Manure CF/D/AU	Annual Days Confined	Annual Days Grazed
CHICKEN(BROILER)	122,000	2	244.0	1.10	0.34	0.46	268.40	82.96	112.24	1.26	270	95
Totals/Averages-	122,000	2	244.0	1.10	0.34	0.46	268.4	83.0	112.2	1.3		

GRAZING PERIOD

Percent of Month and Number of Animals Grazing

Type of Animal	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AU-YR.
CHICKEN(BROILER)	25%	25%	25%	25%	25%	25%	25%	25%	25%	28%	30%	30%	
	122000	122000	122000	122000	122000	122000	122000	122000	122000	122000	122000	122000	764
													0
													0
													0
													0
													0
													0
													0
													0
													0
Total AUM's Available>													0
Total AUM's Needed>>>	61	61	61	61	61	61	61	61	61	68	73	73	764
Total AUM's>>>>>>>>>>	-61	-61	-61	-61	-61	-61	-61	-61	-61	-68	-73	-73	-764

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 1.8

CLIENT: Tracy Buhler

ASSISTED BY: Sarah Harshberger CHECKED BY: Melissa Fery

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

WEATHER STATION: DALLAS 2 NE

Month	25Yr-24Hr	5.50	Lot Runoff Factors as a Percent of Monthly Precipitation	
	Monthly Average in Inches			
	Precipitation	Evaporation	Paved	Unpaved
October	3.59	1.53	50%	20%
November	7.59	0.66	55%	25%
December	8.94	0.57	55%	20%
January	8.23	0.68	57%	25%
February	6.78	0.90	50%	20%
March	5.58	1.23	45%	15%
April	2.83	2.01	40%	10%
May	2.05	3.11	37%	10%
June	1.26	4.01	37%	10%
July	0.40	5.20	30%	0%
August	0.60	4.76	35%	10%
September	1.47	3.22	45%	15%
Annual	49.32	27.88		

AREAS CONTRIBUTING RUNOFF TO LIQUID STORAGE FACILITY

Description of Runoff Area	Area in SF
Paved Lot Area >> Is paved lot scraped daily? (Y/N) NO	0
Unpaved Lot Area >>>	0
Roof Area >>>	0
Surface Area of Silage Storage Facility>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> Does Silage Seepage Drain to Storage Facility? (Y/N) NO	0
Total Runoff Area Contributing to Liquid Storage Facility>>>>>>>>>>>>>>>>	0

WATER USE THAT ENTERS LIQUID STORAGE FACILITY

Type of Water Use	Number of Animals	Number of Washes per Day	Gallons of Water Used per Wash-Day	Total Water Use per Day, Gallons	Total Water Use per Day, Cubic Feet
Animal Washwater	0.0	0	0.00	0	0.0
Equipment Wash		0	0.00	0	0.0
Flushwater		0	0.00	0	0.0
Miscellaneous		0	0.00	0	0.0
Total>>>				0	0.0

CROP DATA

Field Number	Acres	Crop	Condition	Yield Units	Target Yield	Nutrients Removed in Pounds per Acre: Nitrogen N	Phosphorous P_2O_5	Potassium K_2O
May Field	6.0	Grass/Legume Hay/Pasture	DHM	Ton	4.00	136	50	166
Upper Friedrick	13.0	Grass/Legume Hay/Pasture	DHM	Ton	4.00	136	50	166
Lower Friedrick	28.0	Grass/Legume Hay/Pasture	DHM	Ton	4.00	136	50	166
Off-Farm								

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 1.8

CLIENT: Tracy Buhler

ASSISTED BY: Sarah Harshberger

CHECKED BY: Melissa Fery

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

BEDDING VOLUME

Type of Animal	Type of Bedding Facility	Bedding Material	Unit Weight Lbs/CF	Amount Needed Lbs/Day/AU	Volume CF/Day/AU	Total Volume CF/Day	Total Weight Lbs/Day
CHICKEN(BROILER)	Loose Housing	Sawdust	12.00	12.40	0.15	37	3,026

SOLIDS SEPARATION FACTOR

Type of Animal	Type of Separator	Separation Factor %	Volume of Solids Separated CF/Day	Volume of Solids in Liquids CF/Day	Volume of Manure in Liquids CF/Day	Volume of Manure in Solids CF/Day	Accumulated Sludge in Storage CF/Day	Density of Separated Solids Lbs/CF	Weight of Separated Solids Lbs/Day
CHICKEN(BROILER)	Dry Scrape System	100%	344	0	0	307	0	36	12,385
Total Solids>>>			344	0	0	307	0		12,385

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 1.8

CLIENT: **Tracy Buhler**
ASSISTED BY: **Sarah Harshberger**

CHECKED BY: **Melissa Fery**

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY VOLUMES

Month	Runoff in Cubic Feet: Roof Area Square Feet 0	Paved Slab Area Square Feet 0	Unpaved Lot Area Square Feet 0	Silage Pit Surface Area, SF 0	Facility Water Use Cubic Feet	Manure: Solids Cubic Feet	Manure: Liquids Cubic Feet	Bedding: Cubic Feet	Bedding: Pounds	Solids Separated: Cubic Feet	Solids Separated: Pounds	Solids in Liquids: Cubic Feet	Solids in Liquids: Pounds	Total Solids Cubic Feet	Total Liquids Cubic Feet
October	0	0	0	0	0	9,531	0	851	70,345	7,999	287,961	0	0	7,999	0
November	0	0	0	0	0	9,223	0	824	68,076	7,741	278,672	0	0	7,741	0
December	0	0	0	0	0	9,531	0	851	70,345	7,999	287,961	0	0	7,999	0
January	0	0	0	0	0	9,531	0	851	70,345	7,999	287,961	0	0	7,999	0
February	0	0	0	0	0	8,608	0	769	63,538	7,225	260,094	0	0	7,225	0
March	0	0	0	0	0	9,531	0	851	70,345	7,999	287,961	0	0	7,999	0
April	0	0	0	0	0	9,223	0	824	68,076	7,741	278,672	0	0	7,741	0
May	0	0	0	0	0	9,531	0	851	851	7,999	287,961	0	0	7,999	0
June	0	0	0	0	0	9,223	0	824	68,076	7,741	278,672	0	0	7,741	0
July	0	0	0	0	0	9,531	0	817	67,531	7,679	276,443	0	0	7,679	0
August	0	0	0	0	0	9,531	0	794	65,656	7,466	268,764	0	0	7,466	0
September	0	0	0	0	0	9,223	0	769	63,538	7,225	260,094	0	0	7,225	0
Annual	**0**	**0**	**0**	**0**	**0**	**112,216**	**0**	**9,874**	**746,722**	**92,812**	**3,341,220**	**0**	**0**	**92,812**	**0**

DAILY NUTRIENT PRODUCTION

Type of Animal	Pounds/Day of Nutrients from LIQUIDS: N	P2O5	K2O	Pounds/Day of Nutrients from SOLIDS: N	P2O5	K2O	Pounds/Day of Nutrients from GRAZING: N	P2O5	K2O
CHICKEN(BROILER)	0.00	0.00	0.00	268.40	190.06	135.25	268.40	190.06	135.25
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CLIENT: **Tracy Buhler**
ASSISTED BY: **Sarah Harshberger**

CHECKED BY: **Melissa Fery**

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY NUTRIENT PRODUCTION

Month	Pounds of Nutrients from LIQUIDS			Pounds of Nutrients from SOLIDS			Pounds of Nutrients from GRAZING			Pounds of Nutrients going OFF-FARM			Total Pounds of Nutrients from ALL SOURCES		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
October	0	0	0	6,240	4,419	3,145	2,080	1,473	1,048	0	0	0	8,320	5,892	4,193
November	0	0	0	6,039	4,276	3,043	2,013	1,425	1,014	0	0	0	8,052	5,702	4,057
December	0	0	0	6,240	4,419	3,145	2,080	1,473	1,048	0	0	0	8,320	5,892	4,193
January	0	0	0	6,240	4,419	3,145	2,080	1,473	1,048	0	0	0	8,320	5,892	4,193
February	0	0	0	5,636	3,991	2,840	1,879	1,330	947	0	0	0	7,515	5,322	3,787
March	0	0	0	6,240	4,419	3,145	2,080	1,473	1,048	0	0	0	8,320	5,892	4,193
April	0	0	0	6,039	4,276	3,043	2,013	1,425	1,014	0	0	0	8,052	5,702	4,057
May	0	0	0	6,240	4,419	3,145	2,080	1,473	1,048	0	0	0	8,320	5,892	4,193
June	0	0	0	6,039	4,276	3,043	2,013	1,425	1,014	0	0	0	8,052	5,702	4,057
July	0	0	0	5,991	4,242	3,019	2,330	1,650	1,174	0	0	0	8,320	5,892	4,193
August	0	0	0	5,824	4,124	2,935	2,496	1,768	1,258	0	0	0	8,320	5,892	4,193
September	0	0	0	5,636	3,991	2,840	2,416	1,711	1,217	0	0	0	8,052	5,702	4,057
Annual	**0**	**0**	**0**	**72,406**	**51,273**	**36,486**	**25,560**	**18,100**	**12,880**	**0**	**0**	**0**	**97,966**	**69,372**	**49,366**

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 1.8

5/13/2005
STATE: OREGON

CLIENT: **Tracy Buhler**
ASSISTED BY: **Sarah Harshberger**

CHECKED BY: **Melissa Fery**

ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

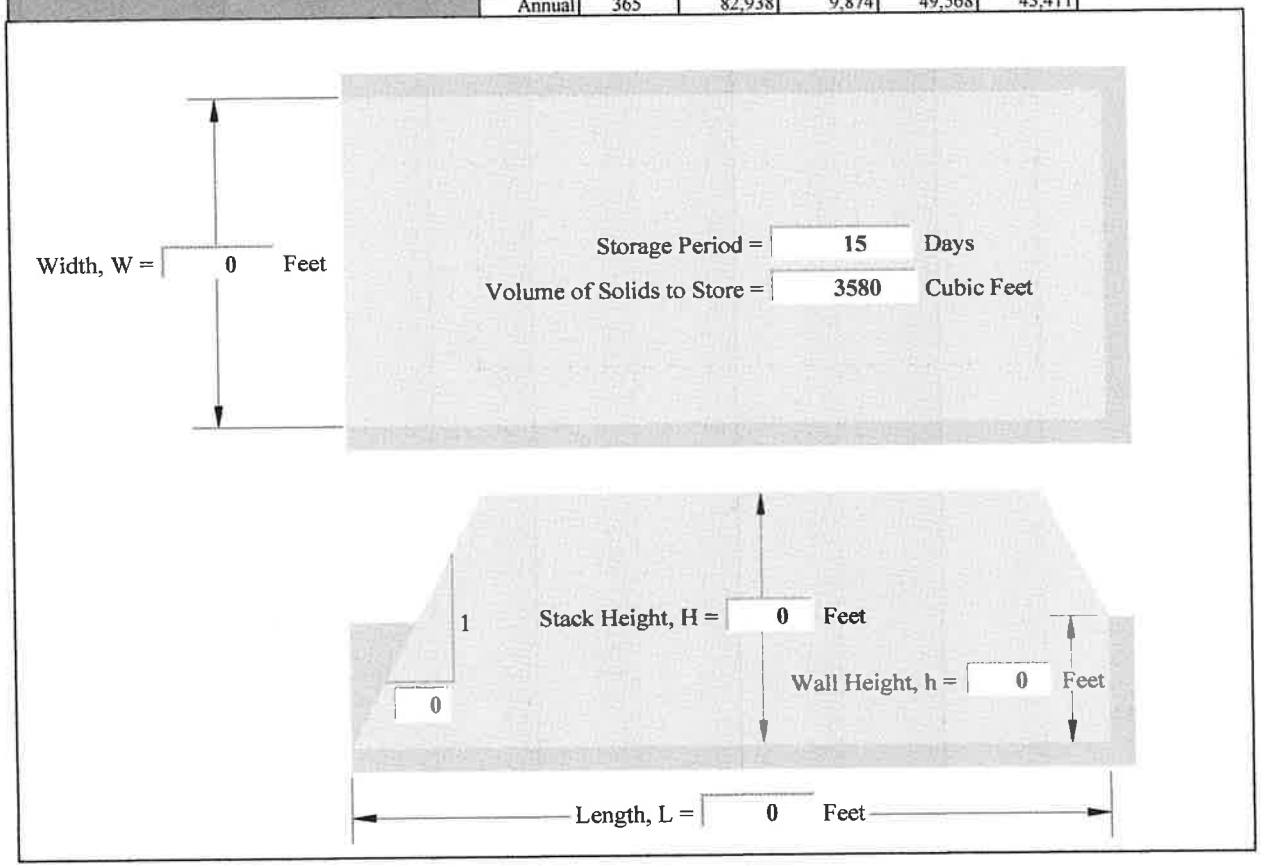
SOLIDS STACKING FACILITY

Solids Storage Facility Parameters	Value
Storage Period, Days=	15
Stacking Width, W in Feet=	0
Stacking Height, H in Feet=	0.00
Wall Height, h in Feet=	0.00
Stack Side Slope (X:1)=	0.00
Existing Storage, Cubic Feet=	4,000
Surface Area of Existing Storage, SF=	1,800
25 Year-24 Hour Storm Runoff, CF=	**825**
Volume Needed, Cubic Feet=	**3,580**
Design Volume, Cubic Feet=	**0**
Is Facility Covered?	YES

MONTHLY SOLIDS VOLUME STACKED IN FACILITY

Month	Number of Days	Manure CF	Bedding CF	Solids to Store CF	Normal Runoff CF
October	31	7148	851	7,162	3,339
November	30	6917	824	3,870	8,539
December	31	7148	851	3,999	8,314
January	31	7148	851	3,999	9,567
February	28	6456	769	3,612	5,695
March	31	7148	851	3,999	3,892
April	30	6917	824	3,870	1,274
May	31	7148	851	3,999	953
June	30	6917	824	3,870	567
July	31	6862	817	3,839	0
August	31	6671	794	3,733	279
September	30	6456	769	3,612	992
Annual	365	82,938	9,874	49,568	43,411

Covered composting area, Some manure storage.



U.S. Department of Agriculture
Natural Resources Conservation Service

CLIENT: **Tracy Buhler**
ASSISTED BY: **Sarah Harshberger**

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 1.8

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5/13/2005
STATE: OREGON

ANIMAL WASTE MANAGEMENT SYSTEM APPLICATION

MANAGEMENT CRITERIA FOR TRACTOR SPREADER APPLICATION OF SOLIDS

To apply **92,812** cubic feet of solids generated from the operation it will take approximately **466** trips annually. Based on applying NITROGEN, N
at agronomic rate use the application depths, travel lengths, and loads per acre listed below for each crop.

Field Number	Acres	Crop	Tractor Spreader Capacity		Spread Width	NITROGEN, N Concentration in Storage Facility		Pounds of Nutrients to be Applied	Number of Applications Needed to meet Crop Demand	Inches of Solids to Apply	Travel Length per Load Needed in Feet	Loads per Acre
			Bushels	CF	Feet	PPM	Lbs/100CF					
May Field	6	Grass/Legume Hay/Pasture	160	199	15	8,126	50.71	136	1.00	0.1	1256	2
pper Friedri	13	Grass/Legume Hay/Pasture	160	199	15	8,126	50.71	136	1.00	0.1	1256	2
ower Friedri	28	Grass/Legume Hay/Pasture	160	199	15	8,126	50.71	136	1.00	0.1	1256	2
0												
0												
0												
0												
0												
0												

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Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET
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STATE: OREGON

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ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

NUTRIENTS AVAILABLE AFTER STORAGE

Nutrient Source	Type of Operation / Type of Storage Facility	Pounds of Nutrients Available			Percent Nutrients Retained After Storage			Pounds of Nutrients Retained After Storage		
		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
	Poultry									
Liquids	Storage Pond (>50%) Dilution	0	0	0	0%	0%	0%	0	0	0
Solids	Solids Storage Facility (Roofed)	72,406	51,273	36,486	65%	90%	90%	47,064	46,146	32,838
Grazing	NONE	25,560	18,100	12,880	0%	0%	0%	0	0	0

NUTRIENTS AVAILABLE AFTER APPLICATION

Nutrient Source	Type of Application System	Pounds of Nutrients Available			Percent Nutrients Retained After Application			Pounds of Nutrients Retained After Application		
		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Liquids	Sprinkling	0	0	0	0%	0%	0%	0	0	0
Solids	Broadcast (Incorporated 7 or more days after application)	47,064	46,146	32,838	70%	100%	100%	32,945	46,146	32,838
Grazing	Grazing	0	0	0	0%	0%	0%	0	0	0

NUTRIENTS AVAILABLE AFTER DENITRIFICATION

Nutrient Source	Location / Soil Drainage Class	Pounds of Nutrients Available			Percent Nutrients Retained After Denitrification			Pounds of Nutrients Retained After Denitrification		
		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
	Between Coastal and Cascade Mountains									
Liquids	Somewhat Poorly Drained	0	0	0	0%	0%	0%	0	0	0
Solids	Somewhat Poorly Drained	32,945	46,146	32,838	83%	100%	100%	27,344	46,146	32,838
Grazing	Somewhat Poorly Drained	0	0	0	0%	0%	0%	0	0	0

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ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

PERCENT OF MANURE TO BE APPLIED TO FIELD AND UTILIZATION ACRES NEEDED BASED ON NITROGEN, N

Field Number	Acres	Crop	LIQUIDS			SOLIDS			GRAZING		
			Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients	Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients	Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients
May Field	6.0	Grass/Legume Hay/Pasture	33%	0	0	2%	547	4	33%	0	0
Upper Friedrick	13.0	Grass/Legume Hay/Pasture	33%	0	0	5%	1,367	10	33%	0	0
Lower Friedrick	28.0	Grass/Legume Hay/Pasture	33%	0	0	8%	2,188	16	33%	0	0
0											
0											
0											
0											
0											
0											
Off-Farm			**0%**	0		**85%**	23,243		**0%**	0	
		TOTALS-	**100%**	**0**	**0**	**100%**	**27,344**	**30**	**100%**	**0**	**0**

NUTRIENT BALANCE BASED ON AVAILABLE ACRES

Field Number	Acres	Crop	NUTRIENTS APPLIED			- NUTRIENTS REMOVED			= NUTRIENT BALANCE		
			Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre
May Field	6.0	Grass/Legume Hay/Pasture	91	154	109	136	50	166	-44	103	-56
Upper Friedrick	13.0	Grass/Legume Hay/Pasture	105	177	126	136	50	166	-30	127	-40
Lower Friedrick	28.0	Grass/Legume Hay/Pasture	78	132	94	136	50	166	-57	81	-72
0											
0											
0											
0											
0											
0											
Off-Farm											

over application of P, but P-Index shows risk as medium.

PHOSPHORUS INDEX WORKSHEET – **WESTERN** OREGON

Producer: Tracy Bubler County: Polk Tract No. _____ Field No(s). Upper Date: 3/15/2005

Soil Map Unit(s): Helmick silt loam Soil Test P: 75 ppm Lab. Method: _____ Sample Depth: 1 foot

Crop Rotation: Hay / Pasture Nutrient Application Method(s) Broadcast

Planner: S. Hashbarger Notes: _____

		PHOSPHORUS LOSS RATING					Weighted Rating Value	
TRANSPORT FACTORS	Factor Weight	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	**Current**	**Planned**
Soil Erosion – tons/ac/yr (RUSLE)	1.50	< 1 (0)	1 – 3 (1.5)	4 – 6 (3.0)	7 – 15 (6.0)	> 15 (12.0)	1.5	
Soil Erosion from Sprinkler Irrigation	0.75	No sprinkler irrigation (0)	Application rate < infiltration rate OR No visible runoff at field borders (0.75)	Application rate = infiltration rate OR Little to no visible runoff at field borders (1.5)	Application rate > infiltration rate OR Visible runoff at field borders (3.0)	Application rate > infiltration rate OR Excessive runoff visible at field borders. Rills and gullies present. (6.0)	0	
Runoff Class	1.00	Negligible (0)	Very low or low (1.0)	Medium (2.0)	High (4.0)	Very High (8.0)	4	
Flooding Frequency Class	0.75	None or very rare (0)	Rare (0.75)	Occasional (1.5)	Frequent (3.0)	Very Frequent (6.0)	0	
Distance to Perennial Surface Waters / Buffer Widths	0.75	> 500 feet OR buffer > 30 ft. wide (or meets NRCS standards) next to surface waters (0)	300 – 500 feet OR buffer 20 - 30 ft. wide next to surface waters (0.75)	200 – 299 feet OR buffer 10 -19 ft. wide next to surface waters (1.5)	100 – 199 feet AND buffer < 10 ft. wide next to surface waters (3.0)	< 100 feet AND No buffer next to surface waters (6.0)	0	
Subsurface Drainage	0.50	No Tile Drains (0)	Tile drains present Soil Test P (Bray P1) < 60 ppm (0.5)	Tile drains present Soil Test P (Bray P1) 61 - 140 ppm (1.0)	Tile drains present Soil Test P (Bray P1) 141- 190 ppm (2.0)	Tile drains present Soil Test P (Bray P1) > 190 ppm (4.0)	0	
						Transport Factors Subtotal (TFS)	5.5	

PHOSPHORUS INDEX WORKSHEET – **WESTERN** OREGON

Tract _____ Fields _____

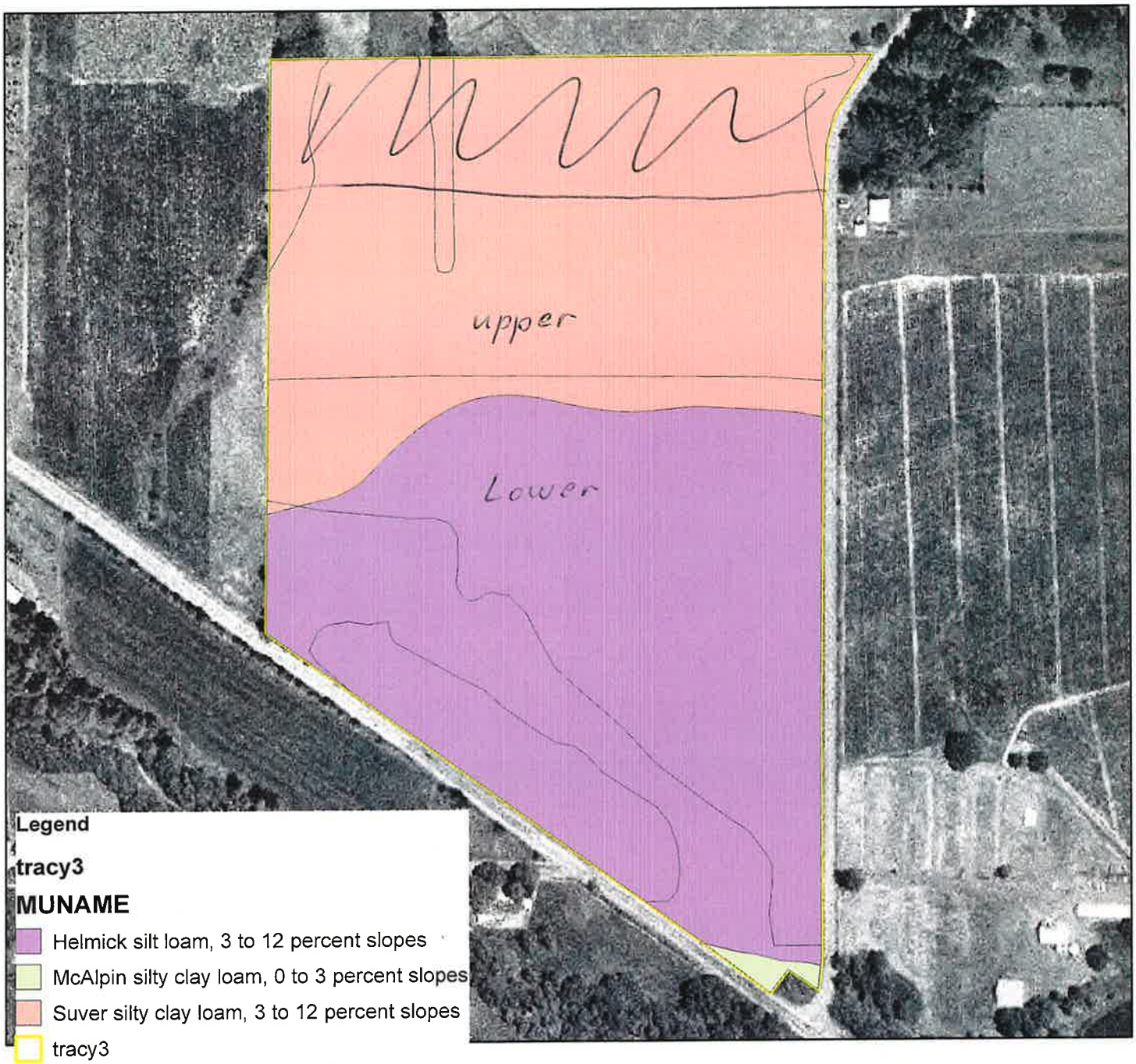
SOURCE FACTORS	Factor Weight	PHOSPHORUS LOSS RATING None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Weighted Rating Value Current	Planned
Soil Test P – ppm (Bray P1)	1.00	(Soil Test P – 40) x 0.10 (75 - 40) x 0.10 = 3.5 (Soil Test P) Assign 0 points if Soil Test P < 40 ppm					3.5	
Commercial P Fertilizer Application Rate	1.00	lbs/ac P_2O_5 x 0.02 0 (lbs/ac P_2O_5) x 0.02 =					0	
Commercial P Fertilizer Application Method	1.00	None Applied (0)	Injected / banded deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	0	
Organic P Source Application Rate	1.00	lbs/ac P_2O_5 x 0.02 282 (lbs/ac P_2O_5) x 0.02 = 5.68					5.68	
Organic P Source Application Method	1.00	None Applied (0)	Injected deeper than 2 inches OR Incorporated within 5 days of application from March through September (1.0)	Incorporated within 5 days of application from October through February OR Surface applied March through August (2.0)	Incorporated more than 5 days after application OR Surface applied September through October (4.0)	Surface applied November through February (8.0)	4	

Total Rating Value TFS + SFS	Site Vulnerability Class
< 13.0	**Low**
13.0 – 25.0	**Medium**
25.1 – 50.0	**High**
> 50.0	**Very High**

	Current	Planned
Transport Factors Subtotal (TFS)	5.5	
Source Factors Subtotal (SFS)	13.18	
Total Rating Value (TFS + SFS)	18.68	
Site Vulnerability Class	medium	

Buhler application area

Assisted By: Tom Finegan



Legend

tracy3

MUNAME

- Helmick silt loam, 3 to 12 percent slopes
- McAlpin silty clay loam, 0 to 3 percent slopes
- Suver silty clay loam, 3 to 12 percent slopes
- tracy3
- practice_instance_point
- practice_instance_polyline
- practice_instance_polygon
- land_unit

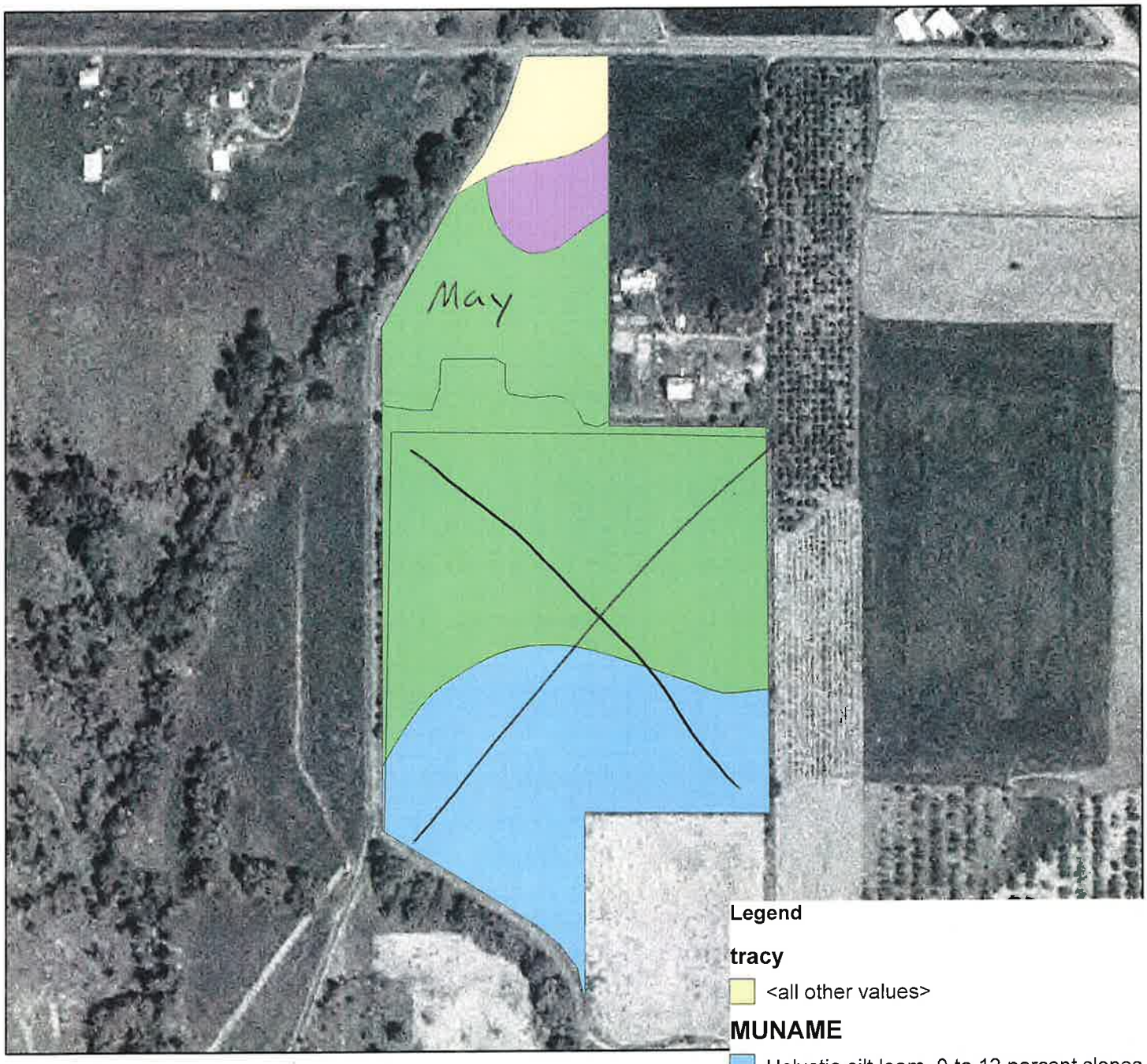
Image: ortho_e1-1_or053_1994.sid

190 0 190 380 570 760 Feet

N

Buhler application area

Assisted By: Tom Finegan



Legend

tracy

- <all other values>

MUNAME

- Helvetia silt loam, 0 to 12 percent slopes
- Steiwer silt loam, 3 to 12 percent slopes
- Waldo silty clay loam
- Woodburn silt loam, 3 to 12 percent slopes
- practice_instance_point
- practice_instance_polyline
- practice_instance_polygon
- land_unit

N

190 0 190 380 570 760 Feet

Image: ortho_e1-1_or053_1994.sid

This soil is in capability subclass IVe.

29E-Hazelair silt loam, 20 to 30 percent slopes.
This moderately well drained to somewhat poorly drained soil is on low, convex foothills. The soil formed in clayey colluvium weathered from sedimentary rock. Siltstone bedrock is at a depth of 20 to 40 inches. Slopes average about 25 percent. Elevation is 300 to 500 feet. The average annual precipitation is 40 to 45 inches, the average annual air temperature is 52 to 54 degrees F, and the frost-free period is about 165 to 210 days.

In a representative profile, the surface layer is very dark grayish brown silt loam and silty clay loam 10 inches thick. The subsoil is very dark grayish brown, mottled silty clay loam about 7 inches thick. The substratum is grayish brown and light olive brown, mottled clay about 21 inches thick. Weathered sedimentary bedrock is at a depth of 38 inches.

Included with this soil in mapping are areas of Bellpine, Suver, Chehulpum, Dupee, Steiwer, and Willakenzie soils, which make up about 10 percent of this map unit.

Permeability is slow. Effective rooting depth is 24 to 30 inches. Available water capacity is 4 to 7 inches, and the water-supplying capacity is 14 to 20 inches. Runoff is rapid, and the hazard of erosion is high. A seasonal high water table is at a depth of 12 to 24 inches in winter and spring.

The soil is used for small grain, grass seed, hay, and pasture. Long-lived, deep-rooted deciduous fruit and nut trees, strawberries, caneberries, and alfalfa are adversely affected by the seasonal high water table. Cross-slope tillage and planting and a winter cover crop help to control erosion. Grassed waterways help to remove excess water. Limiting tillage to seedbed preparation and weed control and leaving the soil cloddy during rainy periods help to protect the soil from erosion. A cropping system that uses soil-building crops for more than 75 percent of the rotation is suitable.

Grain and grass crops respond to nitrogen. Legumes require phosphorus, boron, and sulfur. Lime is generally required to reduce acidity.

This soil generally is not irrigated because of the slope and drainage concerns.

No commercial stands of timber are grown on this soil. It is poorly suited to Christmas tree production because of the seasonal high water table, excessive slope, and clayey subsoil.

Crops produced on this soil provide food and cover for ring-necked pheasant, California quail, and bobwhite quail. In wooded areas of Oregon white oak, Douglas-fir, hazel, bigleaf maple, and other trees and shrubs and grasses, common birds include ruffed grouse, mountain quail, and band-tailed pigeons. These birds feed on the fruit and seeds of trees and shrubs. Black-tailed deer are common in cultivated and uncultivated areas. Planting grassed waterways, planting along roadsides, and maintaining fence rows and brushy areas improve the cover and food supply for wildlife.

The soil has major limitations for homesites, commercial buildings, and local roads and streets because of the slope, the seasonal high water table, the high shrink-swell potential in the subsoil, and the limited ability of the soil to support a load. Dwellings and road construction can be designed to offset the last three limitations. The soil also has major limitations for septic tank absorption fields, sewage lagoons, and sanitary landfills because of the clayey subsoil, the seasonal high water table, the excessive slope, and the slow permeability. It has some limitations for recreational use because of the slope and seasonal high water table.

This soil is in capability subclass IVe.

30C-Helmick silt loam, 3 to 12 percent slopes.
This somewhat poorly drained soil is on slightly convex foot slopes and ridges. It formed in colluvium weathered from sedimentary bedrock. Slopes average about 7 percent. Elevation is 250 to 400 feet. The average annual precipitation is 40 to 60 inches, the average annual air temperature is 49 to 54 degrees F, and the frost-free period is about 165 to 210 days.

In a representative profile, the surface layer is dark brown silt loam and silty clay loam about 10 inches thick. The subsoil is dark brown heavy silty clay loam about 6 inches thick. The substratum is grayish brown, gray, light brownish gray, and strong brown clay that extends to a depth of 62 inches or more.

Included with this soil in mapping are areas of Bellpine, Suver, Steiwer, Dupee, and Willakenzie soils, which make up about 10 percent of this map unit, and Hazelair soils, which make up 5 percent.

Permeability is very slow. Effective rooting depth is 20 to 36 inches. Available water capacity is 5.5 to 7.5 inches, and the water-supplying capacity is 14 to 20 inches. Runoff is medium, and the hazard of erosion is moderate. A seasonal high water table is at a depth of 12 to 24 inches in winter and early in spring.

This soil is used for small grain, grass seed, hay, and pasture. Long-lived, deep-rooted deciduous fruit and nut trees, strawberries, caneberries, and alfalfa are adversely affected by the seasonal high water table. Organicmatter content and tilth can be maintained or improved by returning all crop residue to the soil and using a cropping system in which grasses, legumes, or grass and legume mixtures are grown at least 50 to 75 percent of the time. Sheet and rill erosion can be controlled by cross-slope farming and grassed waterways.

Grain and grasses respond to nitrogen. Legumes require phosphorus, boron, and sulfur. Lime is generally required to reduce acidity.

This soil generally is not irrigated. In areas where irrigation is possible, water needs to be stored in reservoirs. The soil needs drainage for maximum production and use. Open drainage ditches are subject to erosion unless they are carefully laid out.

Drainage generally can be accomplished by interceptor drainageways and some random lines to drain wet spots in the lower areas. Deep, underground tile systems intercept and remove excess water caused by the perched water table and seepage in winter and early in spring.

No commercial stands of timber grow on this soil. The soil is poorly suited to Christmas tree production because of the seasonal high water table and clayey subsoil.

Crops produced on this soil provide food and cover for ring-necked pheasant, California quail, and bobwhite quail. In wooded areas of Oregon white oak and other trees, shrubs, and grasses, ruffed grouse, mountain quail, and band-tailed pigeon are common. These birds feed on the fruit and seeds of trees and shrubs. Blacktailed deer are common in cultivated and uncultivated areas. Using grassed waterways, planting along roadsides, and maintaining fence rows and brushy areas provide cover and food for wildlife.

The soil has major limitations for homesites and commercial buildings because of the seasonal high water table, the shrink-swell potential in the subsoil, and the limited ability of the soil to support a load. Dwellings can be designed to offset some of these limitations. There is some hazard for local roads and streets because of the shrink-swell potential and the seasonal high water table. The soil also has major limitations for septic tank absorption fields, sewage lagoons, and sanitary landfills because of the slope, the clayey subsoil, the seasonal high water table, and the very slow permeability.

This soil is in capability subclass IIIe.

30D-Helmick silt loam, 12 to 20 percent slopes. This somewhat poorly drained soil is on slightly convex foot slopes and ridges. It formed in colluvium weathered from sedimentary bedrock. Slopes average about 16 percent. Elevation is 250 to 400 feet. The average annual precipitation is 40 to 60 inches, the average annual air temperature is 49 to 54 degrees F, and the frost-free period is about 165 to 210 days.

In a representative profile, the surface layer is dark brown silt loam and silty clay loam about 10 inches thick. The subsoil is dark brown heavy silty clay loam about 6 inches thick. The substratum is grayish brown, gray, light brownish gray, and strong brown clay that extends to a depth of 60 inches or more.

Included with this soil in mapping are areas of Bellpine, Suver, Steiwer, Dupee, and Willakenzie soils, which make up about 10 percent of this map unit, and Hazelair soils, which make up 5 percent.

Permeability is very slow. Effective rooting depth is 20 to 36 inches. Available water capacity is 5.5 to 7.5 inches, and the water-supplying capacity is 14 to 20 inches. Runoff is medium, and the hazard of erosion is moderate. A seasonal high water table is at a depth of 12 to 24 inches in winter and early in spring.

This soil is used for small grain, grass seed, hay, and pasture. Long-lived, deep-rooted deciduous fruit and nut trees, strawberries, caneberries, and alfalfa are adversely affected by the seasonal high water table. Cross-slope tillage and planting and a winter cover crop is needed to help control erosion. Grassed waterways help to remove excess water. Limiting tillage to seedbed preparation and weed control and leaving the soil cloddy in rainy periods help to protect the soil from erosion. Organic-matter content and tilth can be maintained or improved by returning all crop residue to the soil and using a cropping system in which grasses, legumes, or grass and legume mixture are grown at least 50 to 75 percent of the time.

Grain and grasses respond to nitrogen. Legumes require phosphorus, boron, and sulfur. Lime is generally required to reduce acidity.

This soil generally is not irrigated. In areas where irrigation is possible, water needs to be stored in reservoirs. Limited drainage can be accomplished by interceptor drains and some random lines to drain wet spots in the lower areas. Deep underground tile systems installed across the slopes intercept and remove excess water caused by a perched water table and seepage in winter and early in spring.

No commercial stands of timber grow on this soil. The soil is poorly suited to Christmas tree production because of the seasonal high water table, excessive slope, and clayey subsoil.

Crops produced on this soil provide food and cover for ring-necked pheasant, California quail, and bobwhite quail. In wooded areas of Oregon white oak and other trees, shrubs, and grasses, common birds are ruffed grouse, mountain quail, and band-tailed pigeons. These birds feed on the fruit and seeds of trees and shrubs. Black-tailed deer are common in cultivated and uncultivated areas. Using grasses waterways, planting along roadsides, and maintaining fence rows and brushy areas improve the cover and food supply for wildlife.

The soil has major limitations for homesites and commercial buildings because of the slope, seasonal high water table, shrink-swell potential in the subsoil, and the limited ability of the soil to support a load. Dwellings can be designed to offset these latter limitations. There is some hazard for local roads and streets because of the shrink-swell potential and the seasonal high water table. The soil also has major limitations for septic tank absorption fields, sewage lagoons, and sanitary landfills because of the slope, the clayey subsoil, the seasonal high water table, and very slow permeability.

This soil is in capability subclass IVe.

30E-Helmick silt loam, 20 to 50 percent slopes. This somewhat poorly drained soil is on slightly convex foot slopes and ridges. It formed in colluvium weathered from sedimentary bedrock. Slopes average about 36 percent. Elevation is 250 to 400 feet. The average annual precipitation is 40 to 60 inches, the average annual air temperature is 49 to 54 degrees F, and

preparation, seeding, and planting. Weeding and thinning are needed for good stand development. The hazard of windthrow is minimal. Swordfern is abundant and is a good source of greenery.

Blue grouse, ruffed grouse, and black-tailed deer are numerous on this soil. Small herds of Roosevelt elk are in the extreme western part of the county. Areas of the soil are often closed to entry in summer and early in fall because of low humidity and high danger of fire. Except for a few major creeks and springs, the drainageways are dry in July, August, and September. Cool sea breezes and fog often add moisture during this period. There are numerous draws and drainageways where small ponds could be built.

The slope is the major limitation to homesites. Roads and streets are subject to slips and slides.

This soil is in capability subclass VIe.

67C-Steiwer silt loam, 3 to 12 percent slopes. This well drained soil is on low foothills. The soil formed in material weathered from sedimentary bedrock. Siltstone is at a depth of 20 to 40 inches. Slopes average about 8 percent. Elevation is 300 to 500 feet.. The average annual precipitation is 40 to 60 inches, the average annual air temperature is 52 to 54 degrees F, and the frost-free period is 165 to 210 days.

In a representative profile, the surface layer is very dark grayish brown silt loam about 15 inches thick. The subsoil is very dark grayish brown and dark brown silty clay loam about 11 inches thick. Partly weathered sedimentary bedrock is at a depth of 26 inches.

Included with this soil in mapping are areas of Chehulpum and Hazelair soils, which make up about 15 percent of this map unit.

Permeability is moderately slow. Effective rooting depth is restricted by sedimentary bedrock at a depth of 20 to 40 inches. Available water capacity is 3.5 to 8 inches, and the water-supplying capacity is 16 to 20 inches. Runoff is medium, and the hazard of erosion is moderate.

This soil is used mainly for small grain, hay, and pasture. Orchards and deep rooted crops are not generally grown on the soil because of limited depth to bedrock and low available water capacity. Properly managing crop residue and using a cropping system in which grass and legumes or a grass and legume mixture are grown help to reduce runoff and erosion and to maintain fertility and workability. Small grain and grasses respond to nitrogen, and legumes respond to phosphorus, sulfur, and, in many places, lime. Where stubble mulching is practiced, additional nitrogen is needed.

Erosion is easily controlled by establishing grassed waterways, cross-slope farming, crop residue management, and winter cover crops. Cover crops planted early in fall help to insure adequate growth.

This soil is not generally irrigated. Irrigation water should be applied carefully at rates low enough to prevent runoff. Irrigation water must be stored in reservoirs, but suitable sites generally are not available. In years without rain late in spring, the soil is quite droughty.

No commercial stands of timber grow on this soil. The soil is only moderately suited to growing Christmas trees because of droughtiness.

Ring-necked pheasant, California quail, and bobwhite quail may be present in cultivated areas of this soil. Native grass, Oregon white oak, wild rose, poison oak, and snowberry provide important food and cover for black-tailed deer and other wildlife.

This soil has some limitations for homesites, commercial buildings, roads and streets, and other community uses because of low strength and slope. It has major limitations for septic tank absorption fields because of depth to bedrock and moderately slow permeability.

This soil is in capability subclass IIIe.

67D-Stelwer silt loam, 12 to 20 percent slopes. This well drained soil is on low foothills. The soil formed in material weathered from sedimentary bedrock. Siltstone is at a depth of 20 to 40 inches. Slopes average about 15 percent. Elevation is 300 to 500 feet. The average annual precipitation is 40 to 60 inches, the average annual air temperature is 52 to 54 degrees F, and the frost-free period is 165 to 210 days.

In a representative profile, the surface layer is very dark grayish brown silt loam about 15 inches thick. The subsoil is very dark grayish brown and dark brown silty clay loam about 11 inches thick. Partly weathered sedimentary bedrock is at a depth of 26 inches.

Included with this soil in mapping are areas of Chehulpum and Hazelair soils, which make up about 15 percent of this map unit.

Permeability is moderately slow. Effective rooting depth is restricted by sedimentary bedrock at a depth of 20 to 40 inches. Available water capacity is 3.5 to 8 inches, and the water-supplying capacity is 16 to 20 inches. Runoff is medium, and the hazard of erosion is high.

This soil is used mainly for small grain, seeded grass, pasture, and hay. Some areas are in native grass and oak. Orchards and deep-rooted crops are not suited to the soil because of limited depth to bedrock and tendency to be droughty. Properly managing crop residue and using a cropping system in which grass and legumes or a grass and legume mixture are grown help to reduce runoff and erosion and to maintain fertility and workability. Small grains and grasses respond to nitrogen, and legumes respond to phosphorus, sulfur, and, in many places, lime. If stubble mulching is practiced, additional nitrogen is needed.

Erosion is easily controlled by establishing grassed waterways, cross-slope farming, crop residue management and winter cover crops. Cover crops planted early in fall help to insure adequate growth.

This soil generally is not irrigated because of the slope. In years without rain late in spring, this soil is quite droughty.

No commercial stands of timber grow on this soil. It is poorly suited to growing Christmas trees because of droughtiness, and the slope which restricts management and harvesting.

Ring-necked pheasant, California quail, and bobwhite quail may be present in cultivated areas of this soil. Native grass, Oregon white oak, wild rose, poison-oak, and snowberry provide important food and cover for black-tailed deer and other wildlife.

This soil has major limitations for homesites, commercial buildings, roads and streets, and other community use because of the slope.

This soil is in capability subclass IVe.

67E-Stelwer silt loam, 20 to 50 percent slopes.

This well drained soil is on low foothills. The soil formed in material weathered from sedimentary bedrock. Siltstone is at a depth of 20 to 40 inches. Slopes average about 30 percent. Elevation is 300 to 500 feet. The average annual precipitation is 40 to 60 inches, the average annual air temperature is 52 to 54 degrees F, and the frost-free period is 165 to 210 days.

In a representative profile, the surface layer is very dark grayish brown silt loam about 15 inches thick. The subsoil is very dark grayish brown and dark brown silty clay loam about 11 inches thick. Partly weathered sedimentary bedrock is at a depth of 26 inches.

Included with this soil in mapping are areas of Chehulpum and Hazelair soils, which make up 15 percent of this map unit.

Permeability is moderately slow. Effective rooting depth is restricted by sedimentary bedrock at a depth of 20 to 40 inches. Available water capacity is 3.5 to 8 inches, and the water-supplying capacity is 16 to 20 inches. Runoff is rapid, and the hazard of erosion is high.

This soil is used mainly for oak and grass pasture. The slope makes this soil unsuitable for cultivation. A permanent plant cover should be kept on the soil at all times. Improved varieties of grasses are desirable for cover if they can be established. Planting these grasses early in spring insures a better cover than if they are planted later and helps to protect the soil from erosion. The soil is droughty. Grasses make little or no growth late in summer and in fall. This soil generally is not fertilized extensively because of droughtiness, but small amounts of fertilizer are applied early in spring or in fall.

This soil generally is not irrigated because of the slope.

No commercial stands of timber grow on this soil. It is poorly suited to growing Christmas trees because of droughtiness and the slope which restricts management and harvesting.

Ring-necked pheasant, California quail, and bobwhite quail may be present in areas of this soil that are near cultivated soils. Native grass, Oregon white oak, wild rose, poison-oak, and snowberry provide important food and cover for black-tailed deer and other wildlife.

This soil has major limitations for homesites, commercial buildings, roads and streets, and other community uses because of the slope.

This soil is in capability subclass VIe.

68C-Suver silty clay loam, 3 to 12 percent slopes.

This somewhat poorly drained soil is on ridges and smooth, low foothills. The soil formed in fine-textured residuum and colluvium weathered from sedimentary bedrock. Bedrock is at a depth of 40 to 60 inches. Slopes average about 8 percent. Elevation is 275 to 800 feet. The average annual precipitation is 40 to 60 inches, the average annual air temperature is 52 to 54 degrees F, and the frost-free period is about 165 to 210 days.

In a representative profile, the surface layer is dark brown silty clay loam about 11 inches thick. The subsoil is brown, reddish brown, and grayish brown, mottled silty clay and clay about 17 inches thick. The upper 1,4 inches of the substratum is light olive gray and pale brown clay, and the lower part is sedimentary bedrock.

Included with this soil in mapping are areas of Bellpine and Hazelair soils, which make up 10 percent of this map unit, and Dupee and Willakenzie soils, which make up 5 percent.

Permeability is very slow. Effective rooting depth is 20 to 36 inches. It is limited by a clayey subsoil and a seasonal high water table. Available water capacity is 4 to 7.5 inches, and the water-supplying capacity is 14 to 20 inches. Runoff is slow, and the hazard of erosion is slight. A seasonal high water table is at a depth of 12 to 24 inches in winter and spring.

This soil is used for small grain, seeded grass, hay, and pasture. Long-lived, deep-rooted, deciduous fruit and nut trees, strawberries, caneberries, and alfalfa are adversely affected by the seasonal high water table. Organic-matter content can be maintained or improved by returning crop residue to the soil and a cropping system that includes soil-building crops 50 to 75 percent of the rotation. Sheet and rill erosion can be controlled by cross-slope farming and grassed waterways.

Grain and grass crops respond to nitrogen, and legumes require phosphorus, boron, and sulfur. Lime is generally required to reduce acidity. If crop residues are used, additional nitrogen is needed to prevent a decrease in yields.

This soil generally is not irrigated. Water for irrigation, where possible, needs to be stored in reservoirs.

The soil needs drainage for maximum production and use. Open drainage ditches are subject to erosion unless care is taken in laying them out. Drainage generally can be accomplished by interceptor drains with some random lines to drain wet spots in the lower areas. Deep, underground tile

systems intercept and remove excess water caused by the perched water table and seepage in winter and early in spring.

No commercial stands of timber grow on this soil. The soil is not well suited to Christmas tree production because of the seasonal high water table and clayey subsoil.

The crops produced on this soil provide food and cover for ring-necked pheasant, California quail, and bobwhite quail. In wooded areas of Oregon white oak, Douglas-fir, hazel, bigleaf maple, and other trees, shrubs, and grasses, common birds include ruffed grouse, mountain quail, and band-tailed pigeons. These birds feed on the fruit and seeds of trees and shrubs. Black-tailed deer are common in both cultivated and uncultivated areas. Planting Douglas-fir, using grassed waterways, planting along roadsides, and maintaining fence rows and brushy areas improve the cover and food supply for wildlife.

The soil has major limitations for homesites (fig. 13), commercial buildings, and local roads and streets because of a seasonal high water table, shrink-well potential in the subsoil, and limited ability of the soil to support a load. Dwellings and road construction can be designed to offset the last two limitations. The soil also has major limitations for septic tank absorption fields, sewage lagoons, and sanitary landfills because of the clayey subsoil, seasonal high water table, and very slow permeability.

This soil is in capability subclass IIIe.

68D-Suver silty clay loam, 12 to 20 percent slopes. This somewhat poorly drained soil is on ridges and smooth, low foothills. The soil formed in fine-textured residuum and colluvium weathered from sedimentary bedrock. Bedrock is at a depth of 40 to 60 inches. Slopes average about 16 percent. Elevation is 275 to 800 feet. The average annual precipitation is 40 to 60 inches, the average annual air temperature is 52 to 54 degrees F, and the frost-free period is 165 to 210 days.

In a representative profile, the surface layer is dark brown silty clay loam about 11 inches thick. The subsoil is brown, reddish brown, and grayish brown mottled silty clay and clay about 17 inches thick. The substratum, to a depth of 14 inches, is light olive gray and pale brown clay. Sedimentary bedrock is at a depth of 42 inches.

Included with this soil in mapping are areas of Bellpine and Hazelair soils, which make up 10 percent of this map unit, and Dupee and Willakenzie soils, which make up 5 percent.

Permeability is very slow. Effective rooting depth is 20 to 36 inches. It is limited by a clayey subsoil and a seasonal high water table. Available water capacity is 4 to 7.5 inches, and the water-supplying capacity is 14 to 20 inches. Runoff is medium, and the hazard of erosion is moderate. A seasonal high water table is at a depth of 12 to 24 inches in winter and spring.

This soil is used for small grain, grass seed, hay, and pasture. Long-lived, deep-rooted, deciduous fruit and nut trees, strawberries, caneberries, and alfalfa are adversely affected by a seasonal high water table. Tilling and planting across the slope and a winter cover crop help to control erosion. Grassed waterways help to remove excess water. Tillage should be limited to seedbed preparation and weed control. Leaving the soil in a cloddy condition during the rainy period helps to protect against erosion. A suitable cropping system provides soil-building crops for more than 75 percent of the rotation.

Grain and grass crops respond to nitrogen. Legumes require phosphorus, boron, and sulfur. Lime is generally required to reduce acidity. If crop residues are used, additional nitrogen is needed to prevent a decrease in yields.

This soil generally is not irrigated. Water for irrigation, where possible, needs to be stored in reservoirs.

Limited drainage can generally be accomplished by installing interceptor drains and some random lines to drain wet spots in the lower areas. Deep, underground tile systems across the slope intercept and remove excess water from a perched water table and seepage in winter and early in spring.

No commercial stands of timber grow on this soil. The soil is not well suited to Christmas tree production because of the seasonal high water table, slope, and clayey subsoil.

The crops produced on this soil provide food and cover for ring-necked pheasant, California quail, and bobwhite quail. In wooded areas of Oregon white oak, Douglas-fir, hazel, bigleaf maple, and other trees, shrubs, and grasses, common birds include ruffed grouse, mountain quail, and band-tailed pigeons. These birds feed on the fruit and seeds of trees and shrubs. Black-tailed deer are common in both cultivated and uncultivated areas. Planting Douglas-fir, using grassed waterways, planting along roadsides, and maintaining fence rows and brushy areas improve the cover and food supply for wildlife.

The soil has major limitations for homesites, commercial buildings, and local roads and streets because of moderate slopes, seasonal high water table, shrink-swell potential in the subsoil, and limited ability of the soil to support a load. Dwellings and road construction can be designed to offset these limitations. The soil also has major limitations for septic tank absorption fields, sewage lagoons, and sanitary landfills because of the clayey subsoil, seasonal high water table, slope, and very slow permeability.

This soil is in capability subclass IVe.

68E-Suver silty clay loam, 20 to 30 percent slopes. This somewhat poorly drained soil is on ridges and smooth, low foothills. The soil formed in fine-textured residuum and colluvium weathered from sedimentary bedrock. Bedrock is at a depth of 40 to 60 inches. Slopes average about 25 percent. Elevation is 275 to 800 feet. The average annual precipitation is 40 to 60 inches, the average annual air temperature is 52 to 54

from a fully stocked, even-aged stand of 80-year-old trees.

Limitations to the use of equipment are major. The slope, stones, and rocks interfere with site preparation, planting, roadbuilding, and intermediate harvesting by tractor logging. Construction and maintenance of roads isdifficult because of the slope. This soil generally is covered with snow during winter months. Roads and landings should be protected with water bars and seeded to grass to prevent erosion.

Plant competition is especially difficult to control in nonstocked areas. This soil is droughty in summer, especially on south-facing slopes. There is some hazard of seedling mortality. Natural regeneration is slow, and this soil may need some supplemental site preparation.

Seeding, planting, weeding, and thinning are needed for good stand development.

Blue grouse, ruffed grouse, and black-tailed deer are numerous on this soil. Small herds of Roosevelt elk are in the extreme western part of the county. Areas of this soil are often closed to entry in summer and early in fall because of low humidity and high danger of fire. Except for a few major creeks and springs, the drainageways are dry in July, August, and September. Cool sea breezes and fog often add moisture during this period. There are numerous draws and drainageways where small ponds could be built.

The slope is the major limitation to homesites.

This soil is in capability subclass VIIs.

71 F-Valsetz-Yellowstone complex, 50 to 90 percent slopes. This complex is in mountainous topography in the Coast Range. These soils formed in material derived from igneous rock. Slopes average about 70 percent. Elevation is 2,000 to 3,500 feet. The average annual precipitation is 70 to 150 inches, the average annual air temperature is about 41 to 45 degrees F, and the frost-free period is about 80 to 100 days.

The Valsetz soil is on the less steep, lower sideslopes and in concave parts of the landscape. It is a moderately deep, well drained gravelly soil that formed in residuum and colluvium weathered from gabbro and diorite. It makes up about 55 percent of the complex. The Yellowstone soil is on the steeper slopes. It makes up about 35 percent of the complex. It is a shallow, well-drained very gravelly soil that formed in residuum and colluvium weathered from igneous rock.

In a representative profile of the Valsetz soil, the surface layer is dark reddish brown stony loam about 4 inches thick. The subsoil is reddish brown and strong brown very gravelly loam about 20 inches thick. Fractured gabbro is at a depth of 24 inches.

Permeability is moderately rapid in the Valsetz soil. Effective rooting depth is 20 to 40 inches. Available water capacity is 1 inch to 2.5 inches, and the water-supplying capacity is 15 to 18 inches. Runoff is very rapid, and the hazard of erosion is high.

In a representative profile of the Yellowstone soil, the surface layer is dark reddish brown stony loam about 4 inches thick. The subsoil and the upper part of the substratum are dark reddish brown very gravelly loam about 14 inches thick. Fractured gabbro and diorite is at a depth of 18 inches.

Permeability is rapid in the Yellowstone soil. Effective rooting depth is 10 to 20 inches. The available water capacity is 1 inch to 2.5 inches, and the water-supplying capacity is 16 to 20 inches. Runoff is very rapid, and the hazard of erosion is high.

Included with this complex in mapping are areas of Luckiamute and Cruiser soils and Rock outcrop.

These soils are used for timber production. The site index for Douglas-fir on the Valsetz soil ranges from 100 to 135, and the average site index is about 115. The site index for the Yellowstone soil is about 80. Based on these average site indices, this map unit is capable of producing about 7,900 and 4,300 cubic feet respectively, or 28,300 and 5,200 board feet (International rule, one-fourth inch kerf) respectively, of merchantable timber from a fully stocked, even-aged stand of 80-year-old trees.

Limitations to the use of equipment are major. The slope limits most operations to cable logging and aerial seeding and weeding. The slope, stones, and rocks interfere with site preparation, planting, roadbuilding, and intermediate harvesting by tractor logging. Construction and maintenance of roads is difficult because of the slope. The map unit generally is covered with snow in winter. Roads and landings should be protected by water bars and seeded to grass to prevent erosion. Slide hazard on these soils may be increased by water accumulation that results from yarding and road construction.

Plant competition is especially difficult to control in poorly stocked areas. There is some hazard of seedling mortality. The soils are droughty in summer, especially on south-facing slopes. Natural regeneration is slow.

Blue grouse, ruffed grouse, and black-tailed deer are numerous in areas of this complex. Small herds of Roosevelt elk are in the extreme western part of the county. Areas of this complex are often closed to entry in summer and early in fall because of low humidity and high danger of fire. Except for a few major creeks and springs, the drainageways are dry in July, August, and September. Cool sea breezes and fog often add moisture during this period. There are numerous draws and drainageways where small ponds could be built.

The slope is the major limiation to homesites.

This complex is in capability subcalss VIIs.

72-Waldo silty clay loam. This poorly drained soil is on flood plains. It formed in silty and clayey mixed alluvium. Slopes are 0 to 3 percent but average about 1 percent. Elevation is about 250 to 450 feet. The average annual precipitation is 40 to 60 inches, the average

temperature is 52 to 54 degrees F, and the frost-free period is 165 to 210 days.

In a representative profile, the surface layer is very dark grayish brown and very dark gray mottled silty clay loam about 13 inches thick. The subsoil is dark gray and dark grayish brown mottled silty clay about 37 inches. The substratum is dark grayish brown mottled silty clay that extends to a depth of 60 inches or more.

Incuded with this soil in mapping are areas of McAlpin soils and Bashaw soils, which make up 10 percent of this map unit.

Permeability is slow. Effective rooting depth is 10 to 20 inches. Available water capacity is 9 to 11 inches, and the water-supplying capacity is 20 to 26 inches. Runoff is slow to very slow or the soil is ponded, and the hazard of erosion is slight. The soil is subject to occasional flooding in spring. A seasonal high water table is within 6 inches of the surface in winter and spring.

This soil is used for pasture, hay, small grain, and grass seed. It is not well suited to deep-rooted perennial crops because adequate drainage outlets generally cannot be maintained in winter and spring.

Erosion caused by seasonal overflow and runoff from higher areas can be controlled by growing a winter cover crop each year and by properly managing crop residue. Proper crop residue management and rotations will also help maintain productivity and workability. A crop rotation system that includes grasses and legumes or a grass and legume mixture at least 25 percent of the time improve tilth and yields.

Small grains and grasses respond to nitrogen, and legumes respond to phosphorus, sulfur, and, in many places, lime. If crop residues are used, additional nitrogen is needed to prevent a decrease in yields.

This soil may be irrigated, but irrigation water should be applied in small enough amounts that the soil is not overirrigated and a water table does not develop.

Drainage is needed if this soil is to be used to the maximum, but providing drainage is difficult in most areas because outlets are poor and the soil is flooded by seasonal overflow. The soil is also periodically flooded by water that flows from higher areas. Response to drainage is good if adequate outlets are provided.

This soil is poorly suited to commercial timber production and Christmas trees because of the seasonal high water table.

Native areas contain ash, willow, sedges, grass, and shrubs. The seasonal high water table, ponding, and overflow limit the use of this soil to ducks and geese from late in fall to early in spring. Waterfowl feed on seeds and tubers from water plants and crop residues. The rest of the year, ring-necked pheasant, California quail, bobwhite quail, mourning dove, and black-tailed deer move into this area for food and cover. The soil is used by some fur-bearing animals.

This soil has major limitations for homesites, commercial buildings, local roads and streets, septic tanks, and other community uses because of the high shrink-swell potential, seasonal high water table, and occasional flooding.

This soil is in capability subclass IIIw.

73-Wapato silty clay loam. This poorly drained soil is in swales and depressions on recent alluvial flood plains. The soil formed in silty mixed alluvium. It is subject to overflow most years. Slopes are 0 to 3 percent and average about 2 percent. Elevation is 125 to 300 feet. The average annual precipitation is 40 to 45 inches, the average annual air temperature is 52 to 54 degrees F, and the frost-free period is 165 to 210 days.

In a representative profile, the surface layer is very dark grayish brown mottled silty clay loam about 15 inches thick. The subsoil is dark grayish brown, dark gray, and gray mottled silty clay loam that extends to a depth of 60 inches or more.

Included with this soil in mapping are areas of McBee, Waldo, and Cove soils.

Permeability is slow. Effective rooting depth is restricted by a seasonal high water table in winter and spring. Available water capacity is 10 to 12 inches, and the water-supplying capacity is 20 to 26 inches. Runoff is slow to very slow or the soil is ponded, and the hazard of erosion is slight. The soil is subject to frequent flooding. A seasonal high water table is within 12 inches of the surface in winter and spring.

This soil is used for pasture, hay, small grain, and grass seed. It is not well suited to deep-rooted perennial crops because adequate drainage outlets generally cannot be maintained in winter and spring.

Erosion caused by seasonal overflow can be controlled by growing a winter cover crop each year and by properly managing crop residues. Proper crop residue management and crop rotations also help to maintain productivity and workability. A crop rotation system that includes grasses and legumes or a grass and legume mixture at least 25 percent of the time improves tilth and yields.

Small grains and grasses respond to nitrogen, and legumes respond to phosphorus, sulfur, and, in many places, lime. If crop residues are used, additional nitrogen is needed to prevent a decrease in yields.

Drainage is needed if this soil is to be used to the maximum. Providing drainage is difficult ,in most areas because outlets are poor and seasonal overflow occurs. The soil is also periodically flooded by water that flows from higher areas. Response to drainage is good if adequate outlets are provided.

This soil is poorly suited to commercial timber production and Christmas trees because of the seasonal high water table.

Native areas contain ash, willow, sedges, grass and shrubs. The seasonal high water table, ponding, and overflow limit the use of this soil to ducks and geese from late in fall to early in spring. Waterfowl feed on seeds and tubers from water plants

cultivated soils. In wooded areas of Douglas-fir, Oregon white oak, snowberry, poison-oak, and grass, common birds include ruffed grouse, mountain quail, and band-tailed pigeons. These birds feed on the fruit and seeds of trees and shrubs. Black-tailed deer are common. Planting along roadsides, using grassed waterways, and maintaining fence rows and brushy areas improve the cover and food supply for wildlife.

This soil has major limitations for all community uses because of the shallow depth to bedrock and the slope.

This soil is in capability subclass VIIs.

77A-Woodburn silt loam, 0 to 3 percent slopes.

This moderately well drained soil is on broad terraces above the flood plain in the Willamette Valley. It formed in silty alluvial deposit. Slopes average about 2 percent. Elevation is 150 to 300 feet. The average annual precipitation is 40 to 45 inches, the average annual air temperature is 52 to 54 degrees F, and the frost-free period is 165 to 210 days.

In a representative profile, the surface layer is very dark grayish brown and dark brown silt loam about 17 inches thick. The upper 6 inches of the subsoil is dark brown silt loam, and the lower part is dark brown and brown silty clay loam that extends to a depth of 65 inches or more. Mottles are common in the lower part of the subsoil.

Included with this soil in mapping are areas of Willamette soils, which make up about 10 percent of this map unit, and Amity soils, which make up 5 percent.

Permeability is slow. Effective rooting depth is greater than 60 inches. Available water capacity is 11 to 13 inches, and the water-supplying capacity is 20 to 26 inches. Runoff is slow, and the hazard of erosion is none to slight. A seasonal high water table is at a depth of 24 to 36 inches in winter and spring.

This soil is well suited to pasture, hay, small grain, grass seed, and vegetable crops. Long-lived, deep--rooted deciduous fruit and nut trees, strawberries, caneberries, and alfalfa are adversely affected by the seasonal high water table unless the soil is drained. Properly managing crop residue and using a cropping system in which grasses and legumes or a grass and legume mixture are grown at least 25 percent of the time help to maintain fertility and workability.

Small grains and grasses respond to nitrogen; row crops respond to nitrogen and phosphorus; and legumes respond to phosphorus, sulfur, and, in many places, to lime. If residues are used, additional nitrogen generally is needed to prevent a decrease in yields.

The soil may be irrigated by sprinkler, furrow, or border irrigation; sprinkler irrigation is the most common and is very satisfactory. Irrigation water should be applied carefully at rates low enough to prevent runoff. Water for irrigation may be from reservoirs or streams.

The soil has moderate drainage concerns which respond to pattern drainage. Drainage is needed for maximum use and production. Seepage from higher soils can be controlled by interception and random drains. Runoff may be controlled by grassed waterways and vegetative cover.

No commercial stands of timber grow on this soil. It is well suited to Christmas tree production.

Native vegetation is grass, hazel, poison-oak, wild blackberry, Douglas-fir, and Oregon white oak, which furnish good food and cover for ring-necked pheasant, California quail, bobwhite quail, and mourning dove. Blacktailed deer are permanent residents, and ducks and geese also feed in areas that are near water. Gopher, ground squirrel, mole, nutria, and opossum are common pests. Planting along streambanks and roadways, using grassed waterways, and preserving fence rows, woodlots, and brushy areas improve cover for wildlife.

This soil has some limitations for homesites, commercial buildings, and local roads and streets because of wetness. It has major limitations for septic tank absorption fields because of slow permeability and the high seasonal water table.

This soil is in capability subclass IIw.

77C-Woodburn silt loam, 3 to 12 percent slopes.

This moderately well drained soil is on broad terraces above the flood plain in the Willamette Valley. It formed in silty alluvial deposits. Slopes average about 7 percent. Elevation is 170 to 300 feet. The average annual precipitation is 40 to 45 inches, the average annual air temperature is 52 to 54 degrees F, and the frost-free period is 165 to 210 days.

In a representative profile, the surface layer is very dark grayish brown and dark brown silt loam about 17 inches thick. The upper 6 inches of the subsoil is dark brown silt loam, and the lower part is dark brown silty clay loam that extends to a depth of 60 inches or more. Mottles are common in the lower part of the subsoil.

Included with this soil are areas of Willamette soils, which make up 10 percent of this map unit, and Amity soils, which make up 5 percent.

Permeability is slow. Effective rooting depth is restricted by the seasonal high water table. Available water capacity is 11 to 13 inches, and the water-supplying capacity is 20 to 26 inches. Runoff is medium, and the hazard of erosion is moderate (fig. 14). A seasonal high water table is at a depth of 24 to 36 inches in winter and spring.

This soil is best suited to small grain, grass seed, hay, and pasture. Long-lived, deep-rooted deciduous fruit and nut trees, strawberries, raspberries, and alfalfa may be adversely affected by the seasonal high water table unless this soil is drained. Properly managing crop residue and using a cropping system in which grasses and legumes or a grass and legume mixture are grown at least 50 percent of the time help to reduce runoff and erosion and to maintain fertility and workability.

Small grain and grasses respond td nitrogen; row crops respond to nitrogen and phosphors; and legumes respond to phosphorus, sulfur, and, in many places, lime. If residues are used, additional nitrogen generally is needed to prevent a decrease in yields. Conservation practices are necessary to maintain fertility and check erosion. Cross-slope farming, grassed waterways, rough tillage, and winter cover or stubble mulch can help control erosion.

This soil may be irrigated by sprinklers. Irrigation increases the hazard of erosion, and water should be applied carefully at rates low enough to prevent runoff. Water for irrigation may be from reservoirs or streams.

Drainage is needed for maximum use and production. Seepage from higher soils can be controlled by interception and random drains. Runoff may be controlled by grassed waterways and vegetative cover,

No commercial stands of timber grow on this soil. It is moderately well suited to Christmas tree production because of the moderate slopes.

Native vegetation is grass, hazel, poison-oak, wild blackberry, Douglas-fir, and Oregon white oak, which furnish good food and cover for ring-necked pheasant, California quail, bobwhite quail and mourning dove. Blacktailed deer are permanent residents, and ducks and geese also feed in areas of this soil that are near water. Gopher, ground squirrel, mole, nutria, and opossum are common pests. Planting along streambanks and roadways, using grassed waterways, and preserving fence rows, woodlots, and brushy areas improve cover and food for wildllife.

This soil has some limitations for homesites, commercial buildings, and local roads and streets because of slope and wetness. Septic tank absorption fields have major limitations because of the slow permeability, slope, and seasonal high water table.

This soil is in capability subclass IIe.

77D-Woodburn silt loam, 12 to 20 percent slopes. This moderately well drained soil is or broad terraces above the flood plain in the Willamette Valley. It formed in silty alluvial deposit. Slopes average about 16 percent. Elevation is 150 to 300 feet. The average annual precipitation is 40 to 45 inches, the average annual air temperature is 52 to 54 degrees F, and the frost-free period is 165 to 210 days.

In a representative profile, the surface layer is very dark grayish brown and dark brown silt loam about 17 inches thick. The upper 6 inches of the subsoil is dark brown silt loam, and the lower part is dark brown silty clay loam that extends to a depth of 60 inches or more. Mottles are common in the lower part of the subsoil.

Included with this soil are areas of Willamette soils, which make up 10 percent of this map unit, and Amity soils, which make up 5 percent.

Permeability is slow. Effective rooting depth is restricted by a seasonal high water table. Available water capacity is 11 to 13 inches, and the water-supplying capacity is 20 to 26 inches. Runoff is medium, and the hazard of erosion is moderate. A seasonal high water table is at a depth of 24 to 36 inches in winter and spring.

This soil is better suited to small grain, grass seed, hay, and pasture than other crops. Long-lived, deep-rooted deciduous fruit and nut trees, strawberries, raspberries, and alfalfa may be adversely affected by the seasonal high water table unless the soil is drained. Properly managing crop residue and using a cropping system in which grasses and legumes or a grass and legume mixture are grown at least 65 percent of the time help to reduce runoff and erosion and to maintain fertility and workability.

Small grain and grasses respond to nitrogen; row crops respond to nitrogen and phosphorus; and legumes respond to phosphorus, sulfur, and, in many places, lime. If residues are used, additional nitrogen is generally needed to prevent a decrease in yields.

Erosion can be controlled by cross-slope farming, establishing permanent grass-cover along natural waterways, and protecting the soil with a winter crop or stubble mulch.

Irrigation is moderately difficult because of the strong slopes. Sprinklers are suitable for applying irrigation water. Application rates should be low enough to prevent erosion. Water for irrigation is generally available from reservoirs or streams.

The slope makes this soil unsuited to grid drainage. In most places, drainage is provided by installing interceptor ditches and random drains.

No commercial stands of timber grow on this soil. It is poorly suited to Christmas tree production because of the slope.

Native vegetation is grass, hazel, poison-oak, wild blackberry, Douglas-fir, and Oregon white oak, which furnish good food and cover for ring-necked pheasant, California quail, bobwhite quail, and mourning dove. Blacktailed deer are permanent residents. Gopher, ground squirrel, mole, nutria, and opossum are common pests. Planting along streambanks and roadways, using grassed waterways, and preserving fence rows, woodlots, and brushy areas improve cover and food for wildlife.

This soil has some limitations to dwellings and local roads and streets because of the slope and wetness. There are major limitations to commercial buildings, septic tank absorption fields, and other community uses because of strong slopes.

This soil is in capability subclass IIIe.

78-Xerochrepts and Haploxerolls, steep. These soils are along streams where drainageways have incised into valley terraces and on terrace fronts above the flood plain along major streams and rivers. Xerochrepts and Haploxerolls, steep are too variable to be classified as a soil series. They are generally silty, loamy or gravelly and are stratified. They formed in

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET
Version 1.8

3/15/2005
STATE: OREGON

CLIENT: **Tracy Buhler**
ASSISTED BY: **Sarah Harshberger**

CHECKED BY:

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY VOLUMES

Month	Runoff in Cubic Feet: Roof Area Square Feet 0	Paved Slab Area Square Feet 0	Unpaved Lot Area Square Feet 0	Silage Pit Surface Area, SF 0	Facility Water Use Cubic Feet	Manure: Solids Cubic Feet	Manure: Liquids Cubic Feet	Bedding: Cubic Feet	Bedding: Pounds	Solids Separated: Cubic Feet	Solids Separated: Pounds	Solids in Liquids: Cubic Feet	Solids in Liquids: Pounds	Total Solids Cubic Feet	Total Liquids Cubic Feet
October	0	0	0	0	0	9,531	0	2,700	63,538	9,372	337,385	0	0	9,372	0
November	0	0	0	0	0	9,223	0	2,613	61,488	9,069	326,501	0	0	9,069	0
December	0	0	0	0	0	9,531	0	2,700	63,538	9,372	337,385	0	0	9,372	0
January	0	0	0	0	0	9,531	0	2,700	63,538	9,372	337,385	0	0	9,372	0
February	0	0	0	0	0	8,608	0	2,439	57,389	8,465	304,735	0	0	8,465	0
March	0	0	0	0	0	9,531	0	2,700	63,538	9,372	337,385	0	0	9,372	0
April	0	0	0	0	0	9,223	0	2,613	61,488	9,069	326,501	0	0	9,069	0
May	0	0	0	0	0	9,531	0	3,009	3,009	10,443	375,943	0	0	10,443	0
June	0	0	0	0	0	9,223	0	2,987	70,272	10,365	373,144	0	0	10,365	0
July	0	0	0	0	0	9,531	0	3,086	72,614	10,711	385,582	0	0	10,711	0
August	0	0	0	0	0	9,531	0	3,086	72,614	10,711	385,582	0	0	10,711	0
September	0	0	0	0	0	9,223	0	2,987	70,272	10,365	373,144	0	0	10,365	0
Annual	0	0	0	0	0	112,216	0	33,621	723,297	116,685	4,200,672	0	0	116,685	0

DAILY NUTRIENT PRODUCTION

Type of Animal	Pounds/Day of Nutrients from LIQUIDS: N	P_2O_5	K_2O	Pounds/Day of Nutrients from SOLIDS: N	P_2O_5	K_2O	Pounds/Day of Nutrients from GRAZING: N	P_2O_5	K_2O
CHICKEN(BROILER)	0.00	0.00	0.00	268.40	190.06	135.25	268.40	190.06	135.25
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

missing some pages.
Re-ran ORAWM 5/13/05

CLIENT: **Tracy Buhler**
ASSISTED BY: **Sarah Harshberger**

CHECKED BY:

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY NUTRIENT PRODUCTION

Month	Pounds of Nutrients from LIQUIDS			Pounds of Nutrients from SOLIDS			Pounds of Nutrients from GRAZING			Pounds of Nutrients going OFF-FARM			Total Pounds of Nutrients from ALL SOURCES		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
October	0	0	0	5,824	4,124	2,935	2,496	1,768	1,258	0	0	0	8,320	5,892	4,193
November	0	0	0	5,636	3,991	2,840	2,416	1,711	1,217	0	0	0	8,052	5,702	4,057
December	0	0	0	5,824	4,124	2,935	2,496	1,768	1,258	0	0	0	8,320	5,892	4,193
January	0	0	0	5,824	4,124	2,935	2,496	1,768	1,258	0	0	0	8,320	5,892	4,193
February	0	0	0	5,261	3,725	2,651	2,255	1,597	1,136	0	0	0	7,515	5,322	3,787
March	0	0	0	5,824	4,124	2,935	2,496	1,768	1,258	0	0	0	8,320	5,892	4,193
April	0	0	0	5,636	3,991	2,840	2,416	1,711	1,217	0	0	0	8,052	5,702	4,057
May	0	0	0	6,490	4,596	3,270	1,830	1,296	922	0	0	0	8,320	5,892	4,193
June	0	0	0	6,442	4,561	3,246	1,610	1,140	811	0	0	0	8,052	5,702	4,057
July	0	0	0	6,656	4,714	3,354	1,664	1,178	839	0	0	0	8,320	5,892	4,193
August	0	0	0	6,656	4,714	3,354	1,664	1,178	839	0	0	0	8,320	5,892	4,193
September	0	0	0	6,442	4,561	3,246	1,610	1,140	811	0	0	0	8,052	5,702	4,057
Annual	**0**	**0**	**0**	**72,516**	**51,351**	**36,542**	**25,450**	**18,022**	**12,824**	**0**	**0**	**0**	**97,966**	**69,372**	**49,366**

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 1.8

3/15/2005
STATE: OREGON

CLIENT: **Tracy Buhler**
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CHECKED BY:

ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

NUTRIENTS AVAILABLE AFTER STORAGE

Nutrient Source	Type of Operation / Type of Storage Facility	Pounds of Nutrients Available			Percent Nutrients Retained After Storage			Pounds of Nutrients Retained After Storage		
		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
	Poultry									
Liquids	Storage Pond (>50%) Dilution	0	0	0	**25%**	**45%**	**55%**	0	0	0
Solids	Solids Storage Facility (Roofed)	72,516	51,351	36,542	**65%**	**90%**	**90%**	47,136	46,216	32,887
Grazing	NONE	25,450	18,022	12,824	**100%**	**100%**	**100%**	25,450	18,022	12,824

NUTRIENTS AVAILABLE AFTER APPLICATION

Nutrient Source	Type of Application System	Pounds of Nutrients Available			Percent Nutrients Retained After Application			Pounds of Nutrients Retained After Application		
		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Liquids	Sprinkling	0	0	0	**75%**	**100%**	**100%**	0	0	0
Solids	Broadcast (Incorporated 7 or more days after application)	47,136	46,216	32,887	**70%**	**100%**	**100%**	32,995	46,216	32,887
Grazing	Grazing	25,450	18,022	12,824	**90%**	**100%**	**100%**	22,905	18,022	12,824

NUTRIENTS AVAILABLE AFTER DENITRIFICATION

Nutrient Source	Location: Between Coastal and Cascade Mountains / Soil Drainage Class	Pounds of Nutrients Available			Percent Nutrients Retained After Denitrification			Pounds of Nutrients Retained After Denitrification		
		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Liquids	Somewhat Poorly Drained	0	0	0	**83%**	**100%**	**100%**	0	0	0
Solids	Somewhat Poorly Drained	32,995	46,216	32,887	**83%**	**100%**	**100%**	27,386	46,216	32,887
Grazing	Somewhat Poorly Drained	22,905	18,022	12,824	**83%**	**100%**	**100%**	19,011	18,022	12,824

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 1.8

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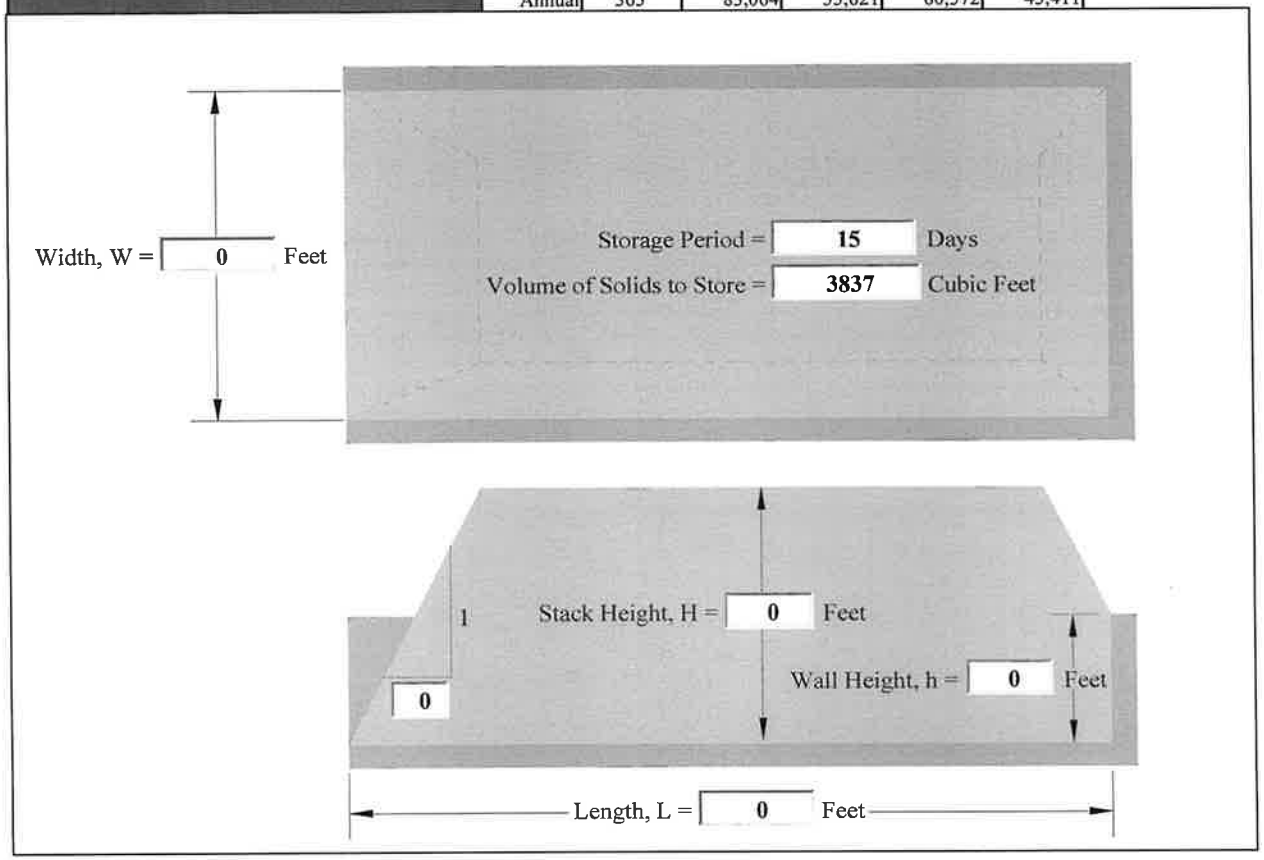
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

SOLIDS STACKING FACILITY

Solids Storage Facility Parameters	Value
Storage Period, Days=	15
Stacking Width, W in Feet=	0
Stacking Height, H in Feet=	0.00
Wall Height, h in Feet=	0.00
Stack Side Slope (X:1)=	0.00
Existing Storage, Cubic Feet=	4,000
Surface Area of Existing Storage, SF=	1,800
25 Year-24 Hour Storm Runoff, CF=	825
Volume Needed, Cubic Feet=	3,837
Design Volume, Cubic Feet=	0
Is Facility Covered?	YES

MONTHLY SOLIDS VOLUME STACKED IN FACILITY

Month	Number of Days	Manure CF	Bedding CF	Solids to Store CF	Normal Runoff CF
October	31	6671	2,700	6,715	3,339
November	30	6456	2,613	4,535	8,539
December	31	6671	2,700	4,686	8,314
January	31	6671	2,700	4,686	9,567
February	28	6026	2,439	4,232	5,695
March	31	6671	2,700	4,686	3,892
April	30	6456	2,613	4,535	1,274
May	31	7434	3,009	5,221	953
June	30	7379	2,987	5,183	567
July	31	7625	3,086	5,355	0
August	31	7625	3,086	5,355	279
September	30	7379	2,987	5,183	992
Annual	365	83,064	33,621	60,372	43,411



CLIENT: **Tracy Buhler**
ASSISTED BY: **Sarah Harshberger**

CHECKED BY:

ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

PERCENT OF MANURE TO BE APPLIED TO FIELD AND UTILIZATION ACRES NEEDED BASED ON NITROGEN, N

Field Number	Acres	Crop	LIQUIDS			SOLIDS			GRAZING		
			Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients	Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients	Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients
May Field	6.0	Grass/Legume Hay/Pasture	33%	0	0	2%	548	4	0%	0	0
Upper Friedrick	13.0	Grass/Legume Hay/Pasture	33%	0	0	5%	1,369	10	0%	0	0
Lower Friedrick	28.0	Grass/Legume Hay/Pasture	33%	0	0	8%	2,191	16	0%	0	0
0											
0											
0											
0											
0											
0											
Off-Farm			0%	0		85%	23,278		100%	19,011	
		TOTALS-	100%	0	0	100%	27,386	30	100%	19,011	0

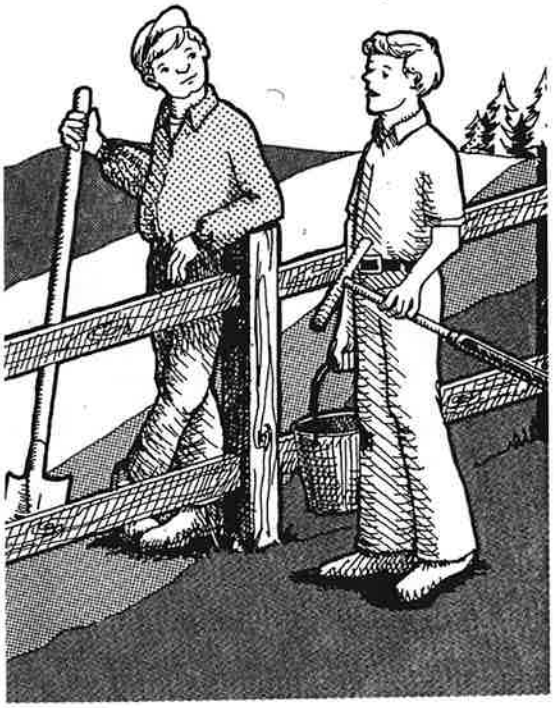
NUTRIENT BALANCE BASED ON AVAILABLE ACRES

Field Number	Acres	Crop	NUTRIENTS APPLIED			- NUTRIENTS REMOVED			= NUTRIENT BALANCE		
			Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre
May Field	6.0	Grass/Legume Hay/Pasture	91	154	110	136	50	166	-44	104	-56
Upper Friedrick	13.0	Grass/Legume Hay/Pasture	105	178	126	136	50	166	-30	127	-39
Lower Friedrick	28.0	Grass/Legume Hay/Pasture	78	132	94	136	50	166	-57	82	-72
0											
0											
0											
0											
0											
0											
Off-Farm											

EC 628 • Reprinted April 2003

Soil Sampling

for Home Gardens and Small Acreages



OREGON STATE UNIVERSITY
EXTENSION SERVICE

Laboratory soil tests will help you develop and maintain more productive soil and increase crop production by providing information on the available nutrient content of your soil. Soil testing helps you select the correct kind and amount of fertilizer and liming material. Recommendations are based on the results of fertilizer experiments, soil surveys, and results obtained by farmers.

A soil sample weighing about 0.5 pound represents from 2 to 40 million pounds of soil in the field. Thus, care in sampling is essential.

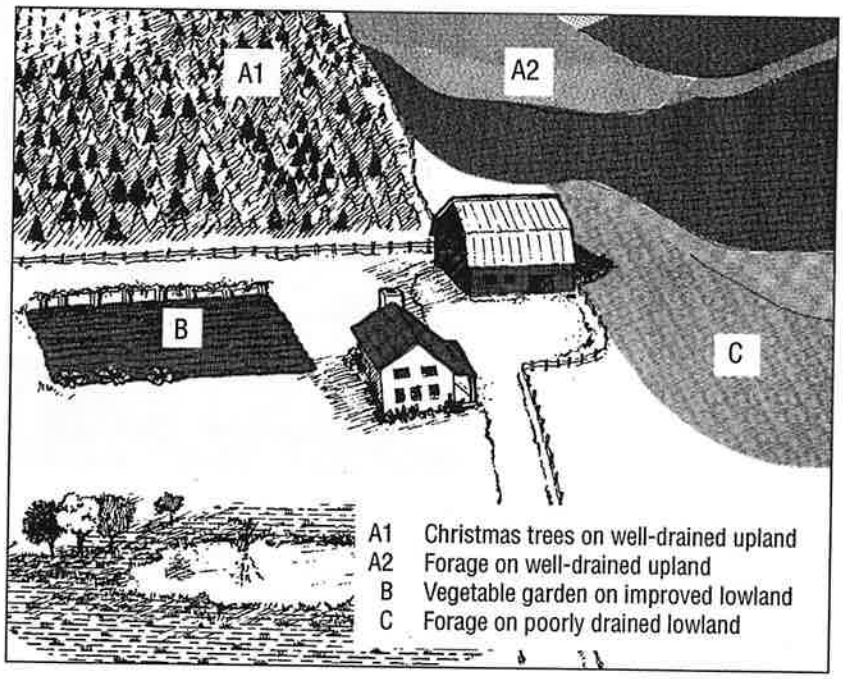
When should I test my soil?

- *For perennial crops* such as orchards, Christmas trees, alfalfa, grass seed, and permanent pasture, the most important time to test the soil is before planting so that necessary nutrients can be mixed into the soil. This test is especially important in acidic soils where liming is likely to be needed. Apply lime and mix it with the soil several months before planting (for example, in the fall for spring planting), since it reacts slowly with the soil. Then:
  - For perennial grass seed, legumes, and pastures, test soil every 3 years after planting.
  - Soil testing usually is not used for established fruit trees, berries, or grapes. Use foliar nutrient analysis instead.
  - Testing soil in timber or Christmas tree plantings usually is not necessary until replanting, unless tree growth is unsatisfactory.
- *For annual crops,* especially vegetables, test soil each year before planting. If you plant successive crops in a single season, you don't need to test before each planting.
- *Additional information* on nutrient testing methods and requirements for various crops is available in OSU Extension publications.

Each soil sample should represent only one soil type or soil condition

The farm in the illustration below has three soil types: A (upland), B (improved lowland), and C (poorly drained lowland). On the upland soil, two areas have different management histories: A1 (Christmas trees) and A2 (pasture).

Sample each soil type (A, B, and C) separately. Areas with different management histories (A1 and A2) also should be sampled separately. In this example, a separate soil sample should be taken from each of the four areas.



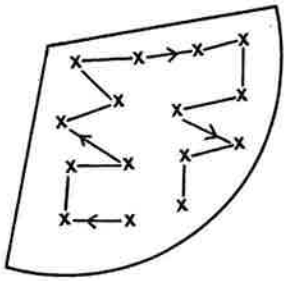
How to sample

Sample where the crop will be planted

If you are using raised beds, such as for vegetable crops, take your samples in the beds, not in the areas between them.

Take 15 to 20 subsamples

Each sample should consist of subsamples (X) taken from 15 to 20 locations within the sampling area.

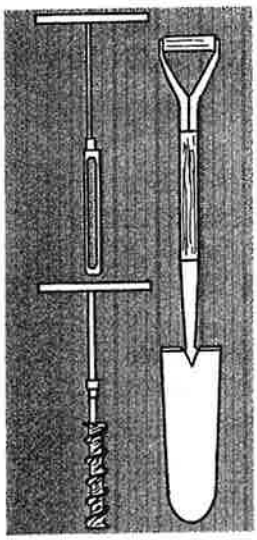


Avoid unusual areas

Avoid sampling in small areas where you know that conditions are different than the rest of the field (for example, former manure piles or fertilizer bands). You often can spot these areas by looking for plants growing very well or very poorly.

Avoid contaminating the sample

- Use clean sampling tools and avoid contaminating the sample during mixing or packaging. A small amount of fertilizer residue on tools or hands, for instance, can cause serious contamination of the soil sample.



- Do not use galvanized, brass, or bronze sampling tools to collect samples that will be tested for micronutrients such as zinc.

Note: This publication is not intended to be used as guidance for obtaining soil samples for environmental testing.

Take the soil sample to the correct depth

- Sample the part of the soil where the plant roots will grow. For most annual and perennial crops, sample from the surface down to about 6 to 9 inches.

Carefully mix the soil sample

Place all of the soil subsamples from a single sampling area in a clean container and mix thoroughly.

Forwarding the soil sample

- A list of laboratories that perform soil tests is available on the Web (http://eesc.oregonstate.edu) or from your county office of the OSU Extension Service.
- Call one or more labs to determine the cost of the soil test you need.
- After choosing a lab, request any necessary paperwork (such as an information sheet), find out how you should prepare and submit the sample, and obtain the address where you should send the sample.
- Prepare and submit the sample according to the instructions. Plastic zipper bags work best; do not use a paper bag. Most laboratories ask you to label the sample bag with identifying information and to fill out and include an information sheet with the sample. Don't forget to include payment.
- Number each sample and keep a record of the fields and areas sampled.

What analysis should I request?

The standard soil test from most laboratories measures organic matter, phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), sodium (Na), and soil pH (acidity). For acidic soils, the SMP buffer test is the best way to determine how much lime is needed. Certain crops might have higher requirements for specific nutrients. Consult OSU Extension publications to determine whether you should test for nutrients such as sulfur (S), boron (B), or zinc (Zn).

Special soil-sampling techniques sometimes are required

- Nitrate nitrogen soil tests are recommended only for a few crops in eastern Oregon.
- For orchards, leaf sampling is more useful than soil sampling.

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religion, sex, sexual orientation, national origin, age, marital status, disability

This publication, originally prepared by E. Hugh Gardner, former Extension soil science specialist, was revised by Michael Robotham, Extension small farms faculty, Clackamas County, and John Hart, Extension soil science specialist; Oregon State University.

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Revised May 1995. Reprinted April 2003.

ANIMAL WASTE SAMPLING

Animal waste analysis is a key component of nutrient management. Complete analyses provide critical information about the animal waste composition, including pH and nutrient content. Actual nutrient content of animal waste varies with the type of animal, feed, storage system, and method of animal waste application. You should sample animal waste stored on site each time it is to be removed (for land application on or off site). Sample daily spread operations (if you land-apply daily) several times throughout the year to obtain a good estimate of nutrient content.

Description

Animal waste sampling is relatively simple, but must be done properly for reliable results. The sampling method differs based on the type of animal waste you generate at your farm (e.g., liquid, semi-solid, solid). Animal waste sampling generally consists of two to seven steps, depending on the type of animal waste. Although the number of steps varies based on the physical state of the animal waste, all of the methods rely on collecting a representative animal waste sample for analysis. Where bedding is collected with the animal waste, include both bedding and animal waste in the sample. Also, conduct sampling as close to the time of land application as possible. Specific techniques for gathering poultry litter, liquid animal waste, semi-solid animal waste, and solid animal waste samples are described below; you can use these to help develop sampling procedures at your farm. Remember that you should sample and analyze all animal waste at your farm. Work with your state and local agricultural Cooperative Extension Offices to ensure that you develop the proper procedures for your conditions and animal waste management methods.

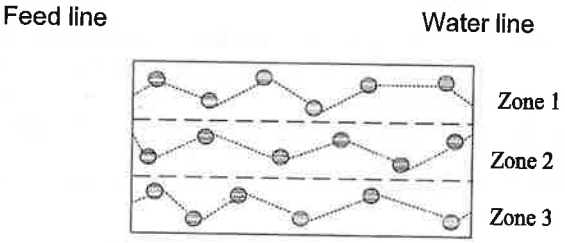
Before sampling, know where the samples are to be shipped, how to pack and ship the sample, and what to use as sample containers. Many laboratories will furnish the proper sample containers for a small charge. Samples should never be collected and shipped in glass bottles, and they should be shipped on wet ice unless otherwise instructed by the laboratory. Contact your state or local agricultural Cooperative Extension Office for a list of laboratories that can perform your analyses. You should also wear gloves at all times, to protect yourself and the sample from contamination.

The test should analyze for such parameters as percentage of dry matter, ammonium-nitrogen, total-nitrogen, phosphorus (P or P_2O_5), and potassium (K or K_2O). Request results in the same units as your calibrated animal waste application system (see Appendix J for more information about calibrating animal waste spreaders and irrigators). For example, if your animal waste application is measured in tons per acre, request that your analysis be reported as pounds of nutrient per ton of animal waste.

Instructions for Collecting Poultry Litter Samples

Poultry litter is a mixture of poultry animal waste and the bedding (e.g., sawdust or rice hull) from houses used to raise broilers, turkeys, and other birds. You will need a clean 5-gallon bucket, a narrow, square-ended spade (or a soil spade), and a 1-quart plastic freezer bag to collect and store your sample. The five steps to collecting a representative poultry litter sample are described below.

Step 1: Mentally divide the poultry house into three zones of equal size. Within each zone, you'll take six cores (i.e., samples) as shown in the diagram below.



Sampling Pattern for Poultry Houses

Step 2: Take the first core within 1 foot of the feed line using your spade. Clear a small trench the width of the spade to the depth of the litter and remove a 1-inch slice, making sure to get equal amounts of litter from all depths. Empty the sample into your bucket.

Step 3: Repeat the process, gathering six cores from each zone, taking your last core within each zone within 1 foot of the water line. Walk the length of the building in each zone in a zigzag pattern taking cores with the spade at random points along your path (as shown in the diagram above). Take a representative number of cores under feeders and waterers. If the bucket becomes full before all 18 samples are taken, dump the contents onto a plastic sheet and continue sampling.

Step 4: After collecting samples from all three zones, crumble and thoroughly mix all of the litter in the bucket. It may be easier to pour the material onto a piece of plastic, or plywood, or into a wheelbarrow to facilitate mixing. Thorough mixing is critical to ensure that the analyzed sample is representative of the entire house.

Step 5: After the litter is well mixed, fill your plastic freezer bag with a subsample (i.e., a small sample) from your composite. Fill the bag only two-thirds full and squeeze the air out before sealing. Keep the sample cool (on ice if possible) until it is shipped.

Instructions for Collecting Liquid Animal Waste Samples

Liquid animal waste is typically stored in tanks, lagoons, or ponds. For tanks, collect only one sample, but collect several subsamples of liquid animal waste to get a representative sample from lagoons and ponds. You will need a clean 5-gallon bucket, a plastic cup, wire, and a long pole to collect liquid animal waste samples from lagoons and ponds. Sample containers are required to collect liquid animal waste samples from all sources. The two steps to collect a representative liquid animal waste sample are described below.

Step 1: For lagoons and ponds, collect several samples from around the shore of the lagoon or pond and mix them together in a clean 5-gallon bucket. You can collect the samples by wiring a plastic cup to the end of a long pole. When taking the sample, turn the cup upside down and push it a few feet below the surface. Then turn the cup right side up and pull out the sample.

If you store your liquid waste in tanks, your tanks must be well agitated before sampling. Often the only practical time to do this is as you are pumping the animal waste into your spreader.

Step 2: Fill a sample container with your sample, making sure to leave 2 inches of air space. Tightly seal the container and keep cool (on ice if possible) until it is shipped.

Instructions for Collecting Semi-Solid Animal Waste Samples

Collecting a representative sample of semi-solid animal waste is best done using a simple sampling device. You will need a 2-inch PVC pipe, nylon rope, a rubber ball, a dowel, a clean 5-gallon bucket, and sample containers. The seven steps to collecting a representative semi-solid animal waste sample are described below.

Step 1: Get a length of 2-inch PVC pipe long enough to reach well into your animal waste storage facility. Cut a notch 2 inches long and 1/4 inch wide at one end of the pipe. Cut a length of nylon rope 2 feet longer than the PVC pipe and tie a knot at one end. Drill a hole through a 2.5 inch rubber ball. Thread the rope through the ball until it is snug against the end knot. Tie a second knot to hold the ball at the end of the rope. Thread the rope through the PVC pipe and pull it until the ball plugs the end of the pipe. Slip your end of the rope into the notch and tie a knot; this will create a "latch" to keep the pipe sealed after you collect the sample. Tie a short dowel to the free end of the rope to serve as a hand grip. Cut a length of 1-inch PVC pipe and seal one end. Use this pipe to push samples out of the tube.

Step 2: With the ball sealing the end of the pipe, push the pipe through the top layer of animal waste to form a sample hole.

Step 3: Release the rope from the notch so that the ball dangles freely from the end of the pipe. Push the pipe into the sample hole in the animal waste crust. Make sure the ball does not block the pipe opening.

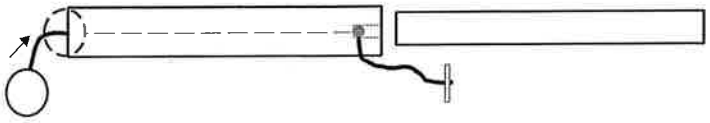
Step 4: Ease the pipe back slightly and pull the rope until the ball seals the end of the pipe. Slip the rope in the notch to anchor the ball in place and withdraw the pipe.

Step 5: Pour the sample into a clean 5-gallon bucket. You may need the 1-inch PVC pipe to force the sample from the pipe. Two people will need to operate a long pipe. To avoid backwash, keep the bottom of the pipe lower than your end.

Step 6: Repeat this process at several locations around the pit.

Step 7: Mix samples thoroughly in the bucket, then fill your sample container with the mix, leaving 2 inches of air space. Tightly seal the container and keep the sample cool (on ice if possible) until it is shipped.

A diagram of the sampling apparatus is shown below.



Sample Apparatus for Semi-Solid Animal Waste

Instructions for Collecting Solid Animal waste

Collecting a representative sample of solid animal waste is best done using a simple sampling device. You will need thin-walled metal tubing (1-inch diameter), a drill, a dowel or short metal rod, a clean 5-gallon bucket, and sample containers. The four steps to collecting a representative solid animal waste sample are described below.

Step 1: Cut a 3-foot length of thin-walled metal tubing and sharpen the bottom edge. Near one end, drill

through the tubing and slide in a dowel or short metal rod to make a handle. Cut a 4-foot length of broomstick to force samples from the tube.

Step 2: Push and twist the tubing all of the way into the animal waste pile. Use the broomstick to push the animal waste into a clean 5-gallon bucket.

Step 3: Repeat Step 2 at several random locations around the pile. It is recommended that the more samples the better, so try to get at least 20 samples.

Step 4: Mix samples in the 5-gallon bucket, and fill the sample container with the mix, leaving 2 inches of air space. Tightly seal the container and keep the sample cool (on ice if possible) until it is shipped.

Animal Waste Sample Analyses

Contact your state or local agricultural Cooperative Extension Office for a list of available laboratories that can analyze your animal waste samples. Some Cooperative Extension Offices may even provide free analysis (e.g., in Maryland).

Label, package, and ship your samples to your contracted laboratory. The laboratory should be able to provide their proper protocol for packaging and shipping samples.

Your animal waste sample is typically analyzed for the following constituents:

- Nitrogen;
- Phosphorus;
- Potassium;
- pH;
- Moisture content;
- Calcium;
- Manganese;
- Magnesium;
- Sulfur;
- Zinc; and
- Copper.

The first step in interpreting analytical results of an animal waste test is to check the units used to report the results. They may be reported as percent nutrient (%) or parts per million (ppm), or, on rare occasions, on a dry-weight basis. (Most animal waste is measured on a wet-weight [i.e., as-is] basis.) The phosphorus and potassium may be reported on an elemental basis (P and K) rather than the phosphate (P_2O_5) and potash (K_2O) basis, which is typical of fertilizers. You will need to convert your animal waste test results into the proper fertilizer units for calculating your animal waste application rate.

Animal waste is an excellent fertilizer if it is spread uniformly on a field and at the proper rate. A pound of animal waste phosphate or potash has a nutrient value equivalent to that of commercial fertilizer. Although it has a value as a fertilizer, typically 50 to 80% of the total nitrogen applied is available to crops.

References

MU Extension, University of Missouri-Columbia. Sampling Poultry Litter for Nutrient Testing.

Cooperative Extension Service, University of Maryland System. Manure Analysis Instruction Sheets.

Who to Contact For More Information

Your Local Cooperative Cooperative Extension Office
Your Local Land Grant University
National Water Management Center/Natural Resources Conservation Service (USDA)

ANIMAL WASTE MANAGEMENT PLAN
MINIMUM REQUIRED ELEMENT

OPERATION AND MAINTANENCE

Buhler Farms (for new storage shed)
Name of Operation

Mark all that apply to your operation.

☐ Above and/or Below Ground Liquid Tank

The tank serves as a collection point for effluent to drain to or be scraped from the animal feeding areas. If the tank will provide storage capacity to the waste management system it shall be completely emptied at the beginning of the storage period and the contents applied to cropland as weather and crop conditions permit. A 1-foot free board will be maintained to prevent spillage. Continually maintain all pumps, agitators, piping valves and all other electrical and mechanical equipment in good operating condition by following manufacturer's recommendations. Float valves will be maintained in good working order. Perform daily inspections of waterlines including drinking water or cooling water lines. Repair leaking lines immediately to prevent excess water from entering the waste storage system. Depth markers are installed to assure maximum volume will be maintained and checked weekly. At least once every 5 years, the tank shall be emptied and inspected for structural damage and leakage. Any damage found shall be corrected before putting the tank back in service. Remove all foreign debris within the structure that may cause damage to pumps and agitator. If below ground, the tank lid will not be subjected to more than two, 8,000 pound wheel loads. Before entering a tank, for any reason whatever, proper ventilation shall be provided, and self-contained breathing apparatus shall be used, if required, when entering a covered tank. No one shall enter the tank unless safety ropes are used and someone else capable of providing assistance is outside of the tank. Warning: Entering Unventilated Tanks Is Extremely Dangerous.

☐ Animal Access Lanes or Walkways

Damaged components will be repaired or replaced as needed. Debris and excess manure will be removed from roadway surfaces, road ditch and drainage areas. Maintain drainage area capacities. Maintain good vegetative cover on all slopes and watercourses.

☐ Agitator

Preventative maintenance will be in accordance with the manufacturer's recommendations. Periodically examine the agitator for proper operation. Clean debris from the propeller and promptly replace any defective or damaged parts. Remove the agitator from the manure tank or pond and periodically clean and oil as needed to increase the life expectancy of the agitator. Immediately repair any vandalism or livestock damage. Do not allow livestock near the equipment during operation.

☐ Concrete Gutters

Floor gutters and grates will be inspected periodically. All foreign material restricting flow will be removed. Damage will be repaired as needed.

☐ Curbs

Curbs, gutters and slabs that are used to convey effluent will be inspected periodically. Broken sections will be repaired or replaced. Manure or other solids will be prevented from building up next to curbs or flowing over them. If over flow is a consistent problem the curb height should be increased.

☐ Culverts

Inspect annually or after large rainfall event. All foreign objects restricting water flow will be removed. Damaged sections will be repaired or replaced. Erosion around inlet or outlet will be corrected.

☒ Dry Stack Storage Facility

Solid manure storage facility will be inspected annually. Broken slabs and curbs will be repaired. Repair or replace rusted or damaged areas on roof structure. Broken gutters and/or downspouts will be repaired or replaced. Check for adequacy and function of drain away from downspouts. Check side and back walls for soundness. Manure solids and leachate will not escape through cracks in the facility.

☐ Fencing

Fences will be inspected periodically. Broken or decayed posts will be replaced. Sagging wire will be tightened. Broken wire will be spliced or replaced. Broken or missing insulators for electric fencing will be replaced. Vegetation will be controlled under the fences. Electric fencing will be sufficiently charged to detour animals.

☐ Filter Strips

Maintain vigorous growth of vegetative covering. This includes reseeding, fertilization and application of herbicides when necessary. Periodic mowing, harvesting or grazing may also be needed to control height. Remove all foreign debris that hinders system operation. Limit the traffic from filter strip area. Limit livestock usage to vegetative growth periods when the animals will not damage vegetative root system or compact the soil. Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage.

☐ Gutters and Downspouts

Gutters will be inspected annually to ensure all gutters are free of foreign materials. Broken gutters or downspouts will be replaced or repaired. Gutters will be connected to downspouts. Leaky gutters and downspouts will be repaired. Weeds and sediment will be removed from downspout outlets. All downspouts will be connected to outlets, which are kept free flowing. Outlets will be inspected for rodent guards and repaired or replaced as needed.

☐ Irrigation Water Management

Irrigation water application will be at rates that minimize transport of sediment, nutrients, and chemicals to surface water and ground water. Equipment modifications and/or soil amendments such as polyacrylamides and mulches should be considered to reduce erosion if needed.

☐ Manure Application Equipment

All manure application equipment (including but not limited to sprinklers, big gun irrigators, spreaders and/or tank wagons) will be operated and maintained according to the manufacturer's manual. Equipment found to be broken or worn will be replaced. Equipment will be calibrated to ensure recommended rates are applied. Liquids will be drained from sprinklers or big guns prior to freezing weather. When system is flushed, rinse water is used following waste, and liquid and sediment is applied agronomically. Nozzles will be checked periodically and if worn, nozzles will be replaced. Minimize exposure to animal and organic waters and manure gasses. Wear protective clothing when appropriate. When cleaning equipment after nutrient application, remove and save wastes in an appropriate manner. Avoid applying manure near surface water by establishing buffer strips and set backs, and use extreme care to avoid contaminating ground water.

☐ Manure Effluent and Irrigation Transfer Lines.

Manure, effluent and irrigation lines shall be flushed with clean water periodically to prevent particle buildup and plugging. Manure flushed from the lines will be applied agronomically so that surface and groundwater will be protected. Manure, effluent and irrigation lines shall be inspected periodically for leaks or worn out nozzles, and repairs or replacements made as needed. Special inspection shall be done to pressure relief valves, risers and control valves. Shut off valves will be inspected annually. Avoid unnecessary travel over pipelines that will damage their integrity. Equipment found to be broken or worn will be replaced. Water will be drained during cold weather to prevent frozen or broken lines. These lines can explode if not properly maintained and may cause human injury.

☐ Pumps

Pumps will be maintained in accordance with manufacturer's operation and maintenance manual. Effluent will be drained from pumps prior to freezing weather. Pumps will be inspected periodically to identify and remove debris wrapped around impeller or worn parts. Appropriate action will be taken to repair any worn parts. Liquids will be drained from pump prior to freezing weather to prevent breakage. It is recommended to have a spare pump or back up system in case a pump must be removed for an extended time for repair.

☒ Roofs

Roofs will be inspected annually. Rusted sections will be replaced or repaired if needed. Loose sections will be secured. All broken trusses, beams, poles, gutters and downspouts will be repaired or replaced.

☐ Solid Manure Separator

The separator should be inspected regularly for deterioration of protective coatings and repaired as necessary. All plumbing will be inspected annually and broken lines will be replaced or repaired. Loose connections will be tightened. If applicable, electric motors, pumps and gears should be routinely maintained. Separator will be operated and maintained according to manufacturer's manual.

☐ Subsurface Drainage System

Subsurface drainage will be inspected annually. Fields will be checked for breaks or suck holes. Outlets will be kept free of vegetation and sediment. Erosion at outlets will be corrected with riprap or other means. Damage or broken lines will be repaired. Outlets from fields on which animal waste is being applied will be monitored daily. Animal waste applications will cease if the tile outflow contains any indication of animal waste.

☐ Trough or Tank

Watering facility will be inspected periodically. Damaged tank/trough will be repaired or replaced. Float valves will be maintained in good working order. Area immediately surrounding the trough/tank will be maintained in a stable condition. Watering facility will be inspected periodically. Damaged tank/trough will be repaired or replaced. Float valves will be maintained in good working order. Area immediately surrounding the trough/tank will be maintained in a stable condition. Watering facilities will not be allowed to overflow if additional liquid will affect waste storage capacities.

☐ Waste Storage Pond

Prior to the storage season, empty the pond to provide storage capacity for the accumulation of wastewater and precipitation during the winter storage period. Sludge and accumulated solids will be removed from the pond periodically when buildup limits storage capacity in the pond. Depth markers are installed to assure maximum volume will be maintained and checked weekly. A 2-foot free board will be maintained to prevent spillage.

Maintain all pumps, agitators, pipeline, valves, and electrical and mechanical equipment in good operating condition following the manufacturer's recommendations. Immediately repair any vandalism, vehicular, or livestock damage to any earth fill. Immediately remove any obstructions or blockage of spillways, trash racks or pipe inlets. Settlement or cracks in earthen sections should be investigated to determine cause and immediately repaired. Maintain vigorous growth of vegetative coverings on the dikes to eliminate soil erosion. Eradicate or otherwise remove all rodents or burrowing animals and repair any damage caused by their activity. Fences and/or warning signs should be maintained as necessary to unauthorized human or livestock entry. Operate systems in a manner that minimizes odor and drift.

☐ _____

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_____

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_____

Signature of Legally Authorized Representative: Tracy W Buhler

Print Name: Tracy W Buhler Date: 11-26-07

Job	Truss	Truss Type	Qty	Ply	0 0	R25489254
TONY	T1A	DBL. MOD. QUEEN	124	1	Job Reference (optional)	

BJ's Metal & Lumber, Salem, OR 97303

6.500 s Apr 2 2007 MiTek Industries, Inc. Thu May 31 07:58:31 2007 Page 1

-1-0-0	8-2-3	15-5-7	22-8-12	30-0-0	37-3-4	44-6-9	51-9-13	60-0-0	61-0-0
1-0-0	8-2-3	7-3-4	7-3-5	7-3-4	7-3-4	7-3-5	7-3-4	8-2-3	1-0-0

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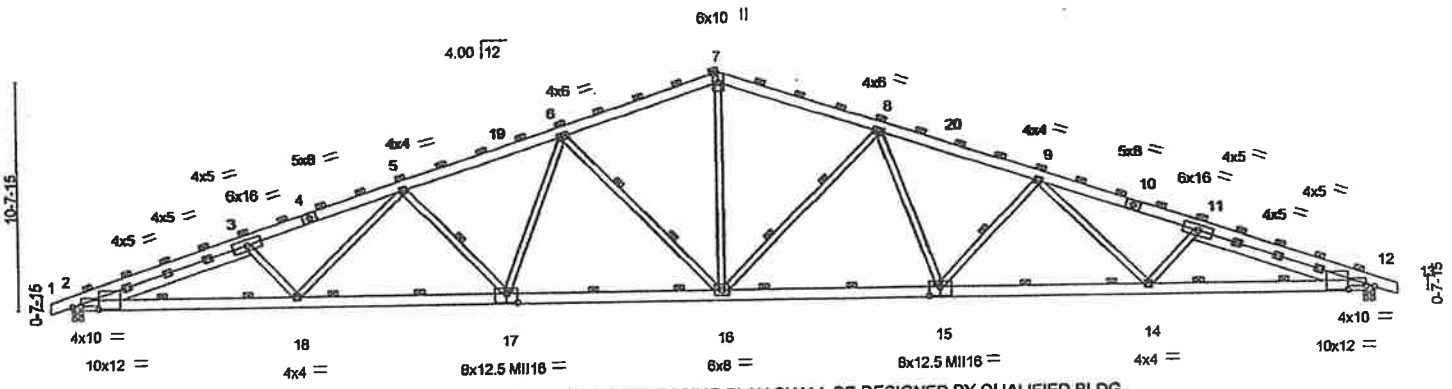

TEMP. AND PERMANENT BRACING PLAN SHALL BE DESIGNED BY QUALIFIED BLDG. DESIGNER AND APPROVED BY ARCHITECT, PROJECT ENGINEER AND LOCAL BLDG. DEPT.

10-5-7	20-0-0	30-0-0	40-0-0	49-6-9	60-0-0
10-5-7	9-6-9	10-0-0	10-0-0	9-6-9	10-5-7

Plate Offsets (X,Y): [2:0-4-14,0-0-10], [2:1-2-14,0-1-6], [12:1-2-14,0-1-6], [12:0-4-14,0-0-10], [15:0-6-0,0-5-0], [17:0-6-0,0-5-0]

LOADING (psf)		SPACING	4-0-0	CSI		DEFL	in	(loc)	l/defl	L/d	PLATES	GRIP
TCLL	25.0	Plates Increase	1.15	TC	0.98	Vert(LL)	-0.81	16	>880	240	MT20	220/195
(Roof Snow=25.0)		Lumber Increase	1.15	BC	1.00	Vert(TL)	-1.67	15-16	>428	180	MII16	176/121
TCDL	4.0	Rep Stress Incr	NO	WB	0.85	Horz(TL)	0.56	12	n/a	n/a		
BCLL	0.0	Code	IBC2006/TPI2002	(Matrix)							Weight: 417 lb	
BCDL	8.0											

LUMBER
TOP CHORD 2 X 6 DF SS G
BOT CHORD 2 X 6 DF SS G
WEBS 2 X 4 DF Stud/Std G *Except*
6-16 2 X 4 DF No.1&Btr G, 7-16 2 X 4 DF No.1&Btr G
8-16 2 X 4 DF No.1&Btr G
SLIDER Left 2 X 6 DF SS -G 7-8-11, Right 2 X 6 DF SS -G 7-8-11

BRACING
TOP CHORD 2-0-0 oc purlins (2-0-2 max.).
BOT CHORD 4-0-0 oc bracing.
WEBS 1 Row at midpt 5-17, 9-15
2 Rows at 1/3 pts 6-16, 8-16
JOINTS 1 Brace at Jt(s): 7

REACTIONS (lb/size) 2=4548/0-6-0, 12=4548/0-6-0
Max Uplift 2=-824(LC 5), 12=-824(LC 5)
Max Grav 2=4617(LC 2), 12=4617(LC 3)

RECEIVED
APR 11 2008
NATURAL RESOURCES DIVISION

FORCES (lb) - Maximum Compression/Maximum Tension
TOP CHORD 1-2=0/33, 2-3=-11379/1786, 3-4=-10910/1687, 4-5=-10787/1700, 5-19=-9268/1522, 6-19=-8963/1533, 6-7=-6989/1283, 7-8=-6989/1283, 8-20=-8963/1533, 9-20=-9268/1522, 9-10=-10787/1700, 10-11=-10910/1687, 11-12=-11379/1786, 12-13=0/33
BOT CHORD 2-18=-1569/10577, 17-18=-1343/9583, 16-17=-1043/8172, 15-16=-1043/8172, 14-15=-1343/9583, 12-14=-1569/10577
WEBS 3-18=-530/299, 5-18=-45/955, 5-17=-1431/398, 6-17=-127/1491, 6-16=-2846/466, 7-16=-486/3434, 8-16=-2846/466, 8-15=-127/1491, 9-15=-1431/398, 9-14=-45/955, 11-14=-530/299

NOTES
1) Wind: ASCE 7-05; 100mph; h=18ft; TCDL=2.4psf; BCDL=4.8psf; Category I; Exp B; enclosed; C-C Interior(1); end vertical left and right exposed; Lumber DOL=1.33 plate grip DOL=1.33.
2) TCLL: ASCE 7-05; Pf=25.0 psf (flat roof snow); Ps=25.0 psf (roof snow); Category I; Exp B; Fully Exp.; Ct=1.1
3) Roof design snow load has been reduced to account for slope.
4) Unbalanced snow loads have been considered for this design.
5) This truss has been designed for greater of min roof live load of 19.0 psf or 2.00 times flat roof load of 25.0 psf on overhangs non-concurrent with other live loads.
6) WARNING: The unusually long span and/or configuration of this truss requires that extreme care be used in its application. Use proper transportation, unloading and erection methods. Assure that all required web lateral bracing is communicated to the building contractor. Ensure that over-all building bracing is designed by a qualified engineer, architect, or building designer.
7) Dead loads shown include weight of truss. Top chord dead load of 5.0 psf (or less) is not adequate for a shingle roof. Architect to verify adequacy of top chord dead load.
8) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.
9) All plates are MT20 plates unless otherwise indicated.
10) This truss requires plate inspection per the Tooth Count Method when this truss is chosen for quality assurance inspection.
11) A plate rating reduction of 20% has been applied for the green lumber members.

Continued on page 2

REGISTERED PROFESSIONAL ENGINEER
16892PE
OREGON
SEPTEMBER 21, 1993
PALMER S. TINGEY

EXPIRATION DATE: 06/30/08
May 31,2007

MiTek
POWER TO PERFORM
7777 Greenback Lane, Suite 109
Citrus Heights, CA, 95610

Job	Truss	Truss Type	Qty	Ply	0 0	R25489253
TONY	STR1	GABLE	2	1	Job Reference (optional)	

BJ's Metal & Lumber, Salem, OR 97303 — 6.500 s Apr 2 2007 MiTek Industries, Inc. Thu May 31 07:58:28 2007 Page 1

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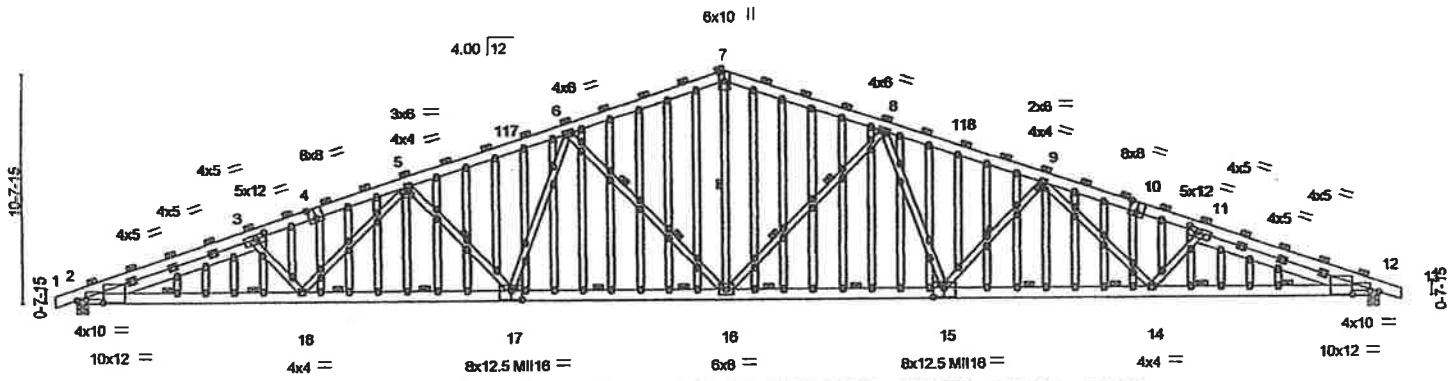


✳ TEMP. AND PERMANENT BRACING PLAN SHALL BE DESIGNED BY QUALIFIED BLDG. DESIGNER AND APPROVED BY ARCHITECT, PROJECT ENGINEER AND LOCAL BLDG. DEPT.

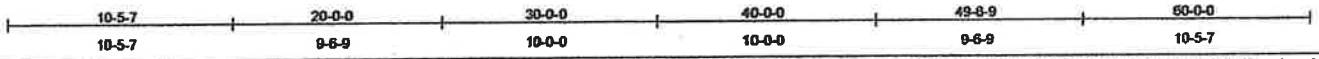


Plate Offsets (X,Y): [2:0-4-14,0-0-10], [2:1-2-14,0-1-6], [3:0-5-6,0-2-0], [4:0-4-0,Edge], [5:0-3-0,0-0-10], [9:0-3-0,0-0-8], [10:0-4-0,Edge], [11:0-5-6,0-2-0], [12:1-2-14,0-1-6], [12:0-4-14,0-0-10], [15:0-6-0,0-5-0], [17:0-6-0,0-5-0]

LOADING (psf)		SPACING	4-0-0	CSI		DEFL	in	(loc)	l/defl	L/d	PLATES	GRIP
TCLL	25.0	Plates Increase	1.15	TC	0.98	Vert(LL)	-0.81	16	>880	240	MT20	220/195
(Roof Snow=25.0)		Lumber Increase	1.15	BC	1.00	Vert(TL)	-1.67	15-16	>428	180	MII16	176/121
TCDL	4.0	Rep Stress Incr	NO	WB	0.85	Horz(TL)	0.56	12	n/a	n/a		
BCLL	0.0	Code	IBC2006/TPI2002	(Matrix)							Weight: 682 lb	
BCDL	8.0											

LUMBER
TOP CHORD 2 X 6 DF SS G
BOT CHORD 2 X 6 DF SS G
WEBS 2 X 4 DF Stud/Std G *Except*
6-16 2 X 4 DF No.1&Btr G, 7-16 2 X 4 DF No.1&Btr G
8-16 2 X 4 DF No.1&Btr G
OTHERS 2 X 4 DF Stud/Std G
SLIDER Left 2 X 6 DF SS -G 7-8-11, Right 2 X 6 DF SS -G 7-8-11

BRACING
TOP CHORD 2-0-0 oc purlins (2-0-2 max.).
BOT CHORD 4-0-0 oc bracing.
WEBS 1 Row at midpt 5-17, 7-16, 9-15
2 Rows at 1/3 pts 6-16, 8-16
JOINTS 1 Brace at Jt(s): 7

REACTIONS (lb/size) 2=4548/0-6-0, 12=4548/0-6-0
Max Uplift2=-1455(LC 5), 12=-1455(LC 5)
Max Grav 2=4617(LC 2), 12=4617(LC 3)

RECEIVED
APR 11 2008
NATURAL RESOURCES DIVISION

FORCES (lb) - Maximum Compression/Maximum Tension
TOP CHORD 1-2=0/33, 2-3=-11379/3390, 3-4=-10910/3243, 4-5=-10787/3257, 5-117=-9268/2866, 6-117=-8963/2877, 6-7=-6989/2353, 7-8=-6989/2353, 8-118=-8963/2877, 9-118=-9268/2866, 9-10=-10787/3257, 10-11=-10910/3243, 11-12=-11380/3390, 12-13=0/33
BOT CHORD 2-18=-3046/10577, 17-18=-2644/9583, 16-17=-2109/8172, 15-16=-2109/8172, 14-15=-2644/9583, 12-14=-3046/10577
WEBS 3-18=-530/430, 5-18=-178/955, 5-17=-1431/653, 6-17=-334/1491, 6-16=-2846/817, 7-16=-1000/3434, 8-16=-2846/817, 8-15=-334/1491, 9-15=-1431/653, 9-14=-178/955, 11-14=-530/430

NOTES
1) Wind: ASCE 7-05; 100mph; h=18ft; TCDL=2.4psf; BCDL=4.8psf; Category I; Exp B; enclosed; C-C Exterior(2); end vertical left and right exposed; Lumber DOL=1.33 plate grip DOL=1.33.
2) Truss designed for wind loads in the plane of the truss only. For studs exposed to wind (normal to the face), see Standard Industry Gable End Details as applicable, or consult qualified building designer as per ANSI/TPI 1-2002.
3) TCLL: ASCE 7-05; Pf=25.0 psf (flat roof snow); Ps=25.0 psf (roof snow); Category I; Exp B; Fully Exp.; Ct=1.1
4) Roof design snow load has been reduced to account for slope.
5) Unbalanced snow loads have been considered for this design.
6) This truss has been designed for greater of min roof live load of 19.0 psf or 2.00 times flat roof load of 25.0 psf on overhangs non-concurrent with other live loads.
7) WARNING: The unusually long span and/or configuration of this truss requires that extreme care be used in its application. Use proper ✳ transportation, unloading and erection methods. Assure that all required web lateral bracing is communicated to the building contractor. Ensure that over-all building bracing is designed by a qualified engineer, architect, or building designer.
8) Dead loads shown include weight of truss. Top chord dead load of 5.0 psf (or less) is not adequate for a shingle roof. Architect to verify adequacy of top chord dead load.
9) This truss has been designed for a 10.0 psf bottom chord live load nonconcurrent with any other live loads.

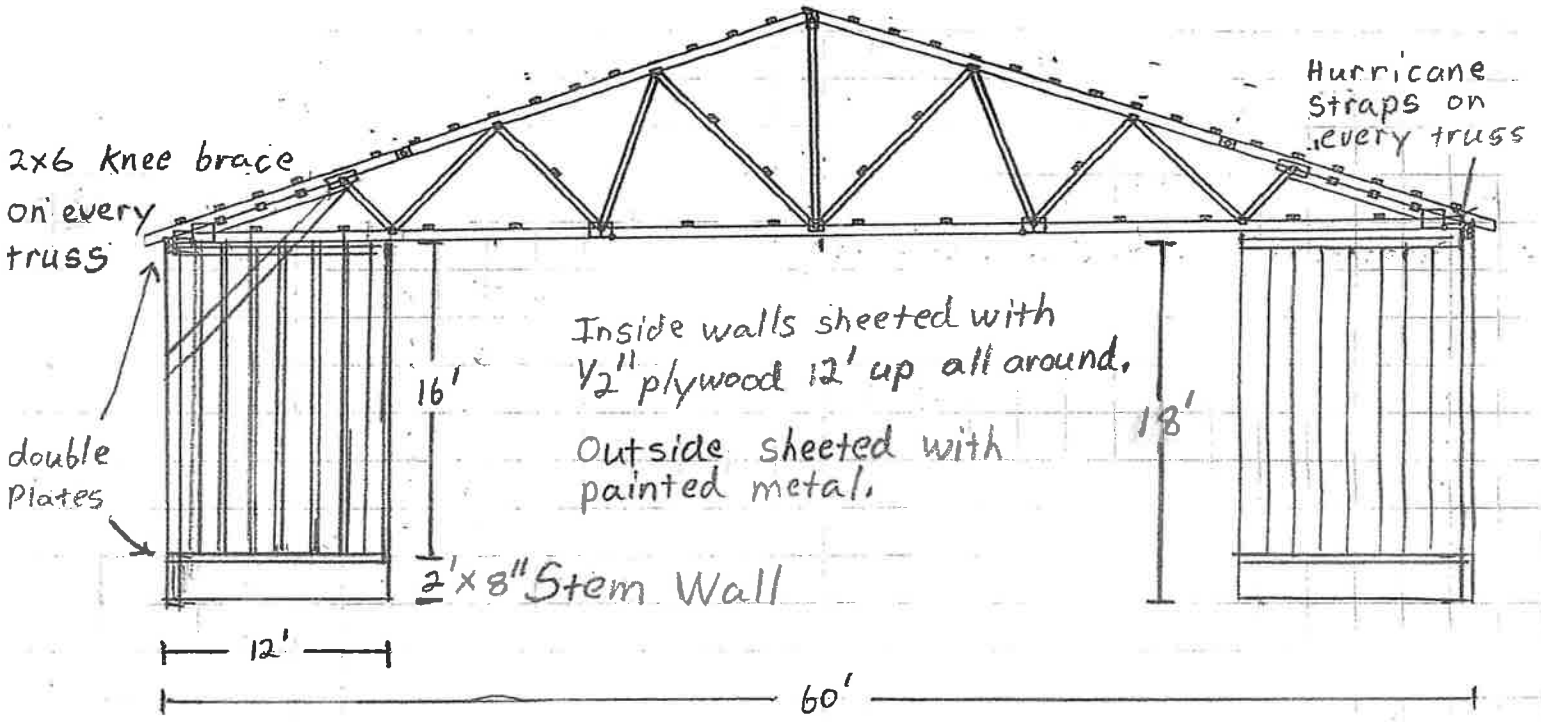
Continued on page 2

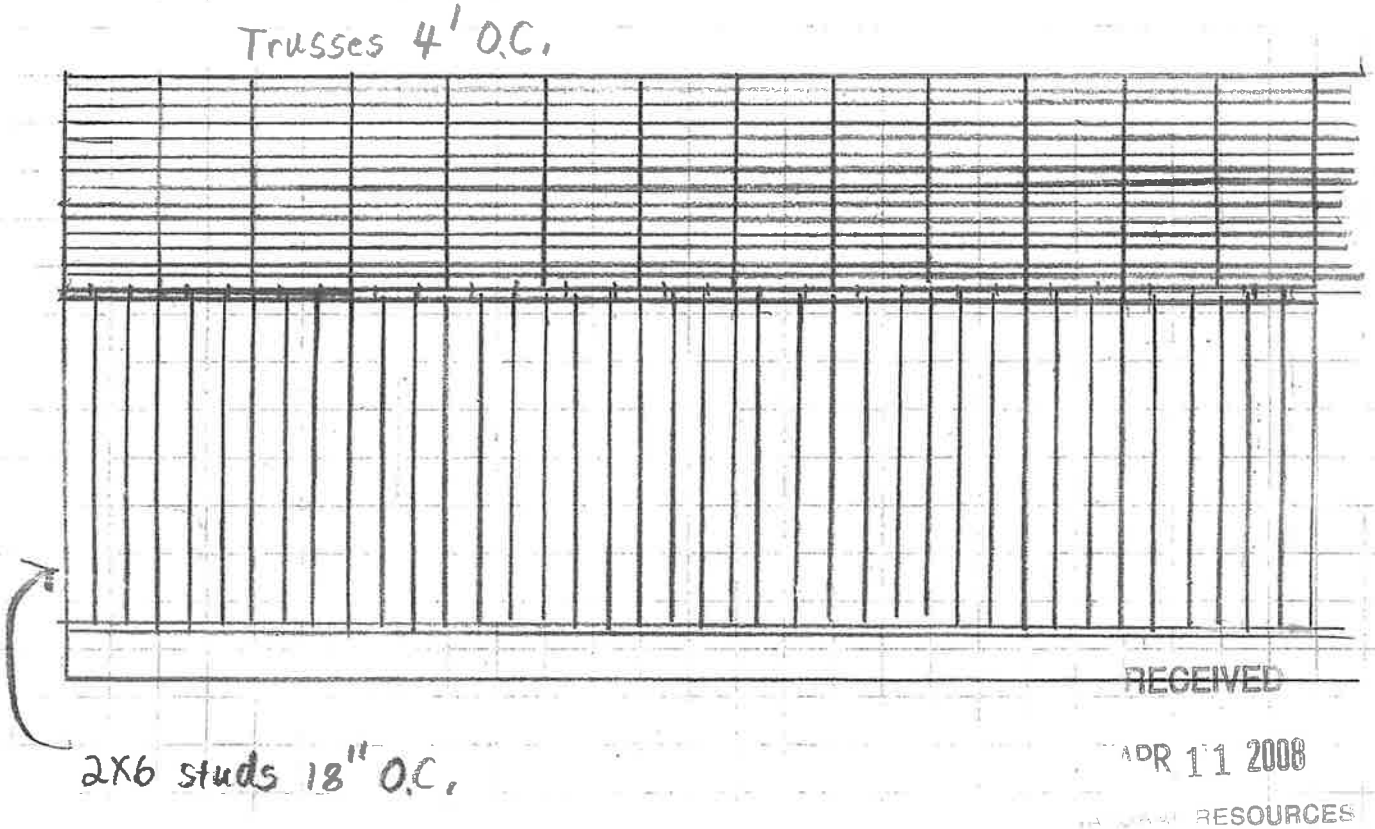
REGISTERED PROFESSIONAL ENGINEER 16890PE OREGON SEPTEMBER 21, 1993 PALMER S. TINGEY

EXPIRATION DATE: 06/30/08
May 31,2007

MiTek
7777 Greenback Lane, Suite 109
Citrus Heights, CA, 95610

1-0-0 8-2-3 7-3-4 7-3-5 7-3-4 7-3-4 7-3-5 7-3-4 8-2-3 1-0-0
Scale = 1:101.7





FEI TESTING & INSPECTION, INC.

Geotechnical & Construction Services

LETTER OF TRANSMITTAL

Date: February 4, 2008

Project No.: 2086011
Report No.: C-14618

Re: 5396 Enterprise Road

To: 5396 Enterprise Road
Dallas, Oregon 97338

Attn: Tracy Buhler

Enclosed are:

- ☐ Report
- ☐ Copy of Letter
- ☐ Other
- ☐ Drawings
- ☐ Specifications
- ☑ Test Results (2 Pages Total Incl. Cover)

These are transmitted as checked below:

- ☑ For your use
- ☑ As requested
- ☐ For your review/approval
- ☐ For your files

Remarks: Requested laboratory testing results attached. Please call if you have any questions.

Copy to:

Signature:

Sean Daughtry
Laboratory Supervisor

5 psi gradient

FEI Testing Inspection, Inc.
750 NW Cornell Ave.
Corvallis, Oregon 97330
541-757-4698

3765Enterprise.XLS

Project Name: 3765 Enterprise Road
Sample Designation: 3806
Sample Description: Brown SILT sampled from the center of the barn floor.

Project No.: 2086011
Date: 2/4/2008
Depth: 0-6"

Board: TODD **Cell:** 1

Water Content	Initial		Final
Pan No.	15		23
Wet soil + pan (g)	127.42		598.65
Dry soil + pan (g)	104.02		467.6
Tare (g)	8.27		69.88
Water Content (%)	24.4%		32.9%
Density			
Wet weight (g)	200.05		Max (pcf)
Wet unit weight (pcf)	106.1		0.0
Dry unit weight (pcf)	85.2		

Dimensions	
Diam (in)	2.830
Length (in)	1.140
Length (cm)	2.90
Area (cm^2)	40.60
Volume (cm^3)	117.70
Pressures	
Back	30
Head	35
Cell	40
P	351.5

Date	Clock	Pedestal	Cap	D Time (sec)	Q in	Q out	k (cm/s) total	k increment
4-Feb	9:36:00	0.0	42.0	0				
4-Feb	10:14:00	18.2	26.5	2280	18.2	15.5	1.62E-06	1.62E-06
4-Feb	10:22:00	19.0	23.7	2760	19.0	18.3	1.40E-06	3.39E-07
4-Feb	10:28:00	21.4	21.4	3120	21.4	20.6	1.39E-06	1.35E-06
4-Feb	11:03:00	36.5	6.5	5220	36.5	35.5	1.42E-06	1.46E-06
4-Feb	11:17:00	41.8	1.3	6060	41.8	40.7	1.40E-06	1.28E-06
						Average =	1.45E-06	1.21E-06
					FINAL k (cm/sec):		1.45E-06	1.21E-06
					B value:		0.95	