GENERAL INFORMATION

Oregon Department of Agriculture CAFO Division Animal Waste Management Plan Signature Sheet	ODA USE ONLY MA# 1000117 AWMP# 19022 Approved Date 8/30/19 Received Date 10/18/18

Facility Name: Aguiar Dairy

Facility Address: 15555 Moss Creek Road

Bay City, OR 97107

Operated by: Manny and Cathy Aguiar

Mailing Address: 15555 Moss Creek Road

Bay City, OR 97107

Complete if different than the Operator

Owned by: Manny and Cathy Aguiar

Mailing Address: 15555 Moss Creek Road

Bay City, OR 97107

☐ **As the Operator of Aguiar Dairy, I agree to manage this facility in accordance with the existing Animal Waste Management Plan (AWMP) # 19022 on file with ODA and maintain those practices as described in the plan. This signed AWMP is incorporated into the CAFO NPDES General Permit by reference (Permit Condition S3.A.2.).**

☐ **If changes are made to the animal population, facilities and/or management of the CAFO, a new AWMP must be submitted to ODA for approval at least 45 days before the modification is implemented unless a different schedule is allowed by ODA in writing (Permit Condition S3.D.1 and 2).**

Operator's Signature	Date
Manuel Aguiar Jr Cathy Aguiar	9-12-19

Operator's Name (Please Print)

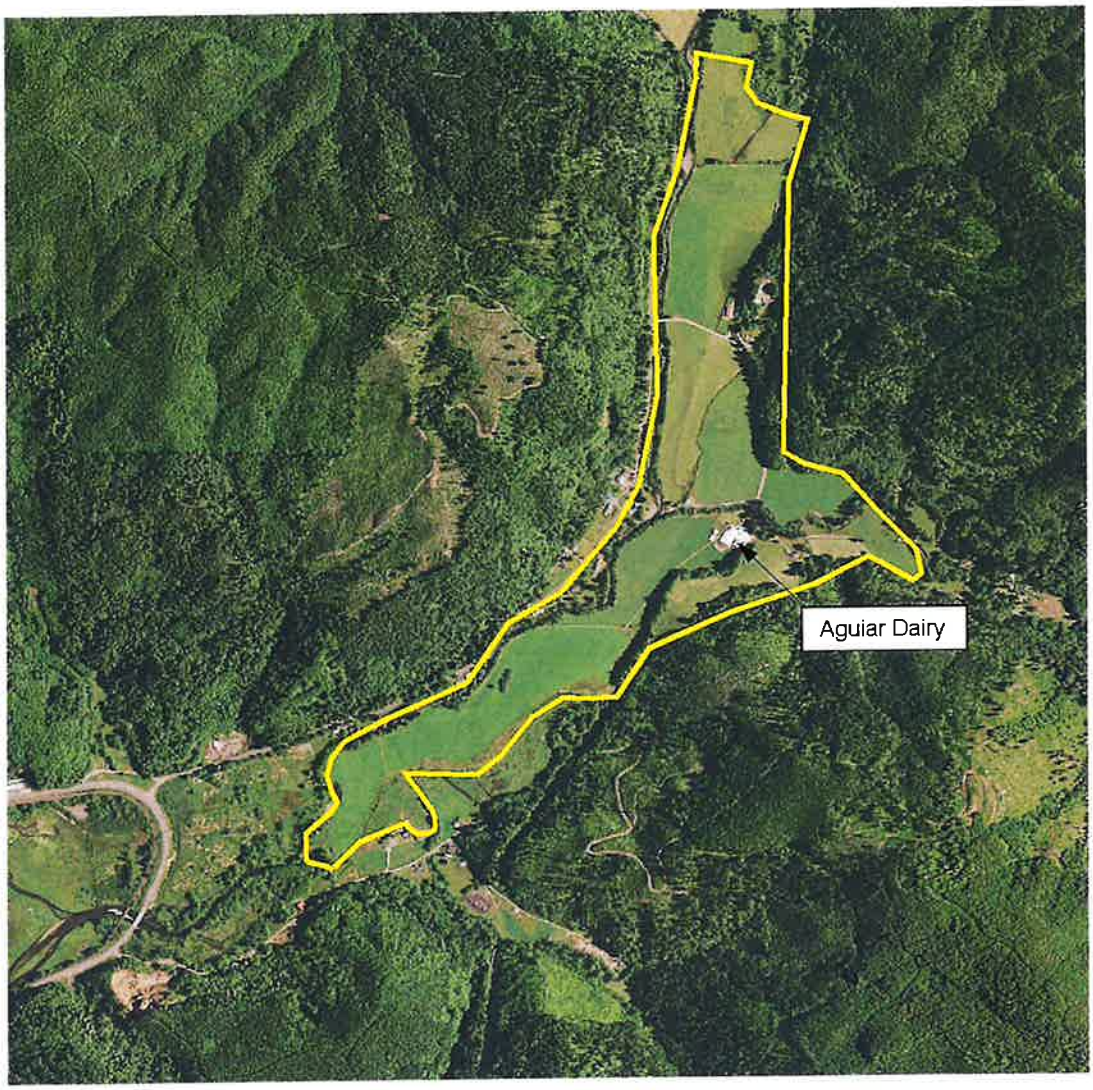
Manny and Cathy Aguiar

Recd 9/23/19


AGUIAR DAIRY
Dairy Headquarters Map
Machinery Storage
Pumphouse
Proposed New
Milk Parlor
30x40 feet
House
Bedding
Pushup
AG Tank
60x16 ft
UG Tank
48x10 ft
Parlor
Freestall
Calves
Round Bale
Storage
Freestall Barn
Freestall
Dry Cow
BROWN lines denote direction
of manure movement
NORTH
SCALE: 1 inch = 70 feet
GIS Mapping by Northwest Ag Consulting

Nutrient Management Plan
for
Aguiar Dairy

c/o Manny and Cathy Aguiar
15555 Moss Creek Road
Bay City, OR 97107
(530) 321-3961



Prepared by:
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NW Agricultural Consulting
Dallas, OR
(503) 510-3883

#19022

Recd 10/11/18
AWMP # 19022
MA # 1000117

Aguiar Dairy

2017

Nutrient Management Plan

Aguiar Dairy

2017

Nutrient Management Plan

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GENERAL INFORMATION

BACKGROUND AND SITE INFORMATION

Animal Feeding Operation: Medium Confined CAFO

Type & Size: Dairy- 385 animals

Latitude/Longitude: N45.5691^0, W123.8720^0

Aguiar Dairy is located approximately a 2.9 miles northwest of Garibaldi, Oregon in Tillamook County, Oregon. Aguiar Dairy is located in the Miami River watershed which drains to Tillamook Bay. Any runoff containing animal manure or leaching of nutrients from animal manures would have a significant negative impact on wildlife habitat and water quality of the Miami River and its tributaries.

Aguiar Dairy is owned and managed by Manny and Cathy Aguiar and their family who are planning to milk 235 cows on this dairy. The total number of dairy animals to be care for at this dairy are 385 consisting of 275 mature cows and 110 heifers and calves. The maximum number of animals the dairy is permitted for is 300 dairy animals consisting of 206 mature cows and 96 heifers and calves. An application to modify permitted animal numbers is located on page 5-13.

The dairy consists of one farm with milking cows and calves located at the dairy at the south of the property and the heifers and dry cows housed at the northern end of the property.

The milking cows are housed in freestall barns and grazed from April through October weather permitting. Grazing is based on weather conditions, livestock health, economic conditions, and excessive forage production during the year. Tillamook County Creamery Association provide livestock mortality service.

The Coastal climate allows for a base forage production level of approximately 6 tons/acre of DM per year based on minimal management. With an intensive level of management, the fields may produce as much as 8-10 ton/acre DM annually. However, this is only an estimate and depends upon intensive management coupled with favorable weather conditions.

The barns are scraped into 48x10 foot underground reception tank located in the NE corner of the barn complex. Manure is then pumped to the above ground 60x16 foot tank for storage until needed for field application. Solid manure, bedding, and waste feed is scraped to a covered 50x12x6.5-foot solid storage area between the barns. Storage capacity is estimated to be 55 days for liquid and more than 365 days for solid manure.

Liquid manure is transferred to the fields via a system of buried mainlines and risers and applied at agronomic rates with a big gun traveler or honey wagon. Solid manure is applied with a manure spreader and spread onto the fields.

GENERAL INFORMATION

There are approximately 249 acres of owned and leased land available for utilization of the manure generated by the animals. Fields are broken into pastures and planted to grass that is either grazed rotationally or mechanically harvested as needed.

Forage

Performance based nutrient management will be employed to insure nutrient balance on all fields. Forage yield will be tracked annually and used to determine the rate of manure application on a per field basis. Manure will be tested annually and tested values will guide application rates. Actual yield varies from year to year depending upon weather conditions and specific field management. Pastures are well managed and in good condition.

The soil concentration of phosphorus ranges from low to high in the Aguiar Dairy hay and pasture land fields. Applications of wastewater and solids containing manure are planned on a nitrogen basis on all fields and the soil phosphorus concentrations will be monitored using soil tests. Some solids containing manure may have to be exported off farm if the soil concentrations of phosphorus increase significantly in the future. It is estimated that the dairy produces enough manure to meet the nutrient demand for the crop, hay and pasture land fields. Supplemental nutrient applications to the crop, hay and pasture land fields should be based on soil tests and fertilizer guides to prevent excess soil nutrient concentrations.

Mortalities that occur during the year on the Aguiar Dairy are disposed of by a service provided by Tillamook Creamery.

GENERAL INFORMATION

MANURE STORAGE AND NUTRIENT BALANCE SUMMARY

Manure Storage-

Storage Type:	Capacity	Estimated Storage Period
Dairy 48x10 Tank-	134,001 Gal	16 Days
Dairy Solids Storage-	69 Ton	>365 Days
Dairy 60x16 Tank-	317,238 Gal	39 Days
Heifer Solids Storage-	53 Ton	>365 Days

Nutrient Balance-

Nutrients Generated:	N Generated (lbs) after Losses	P_2O_5 Generated (lbs) after Losses
Solid Manure-	207 lbs	230 lbs
Liquid Manure-	23,086 lbs	16,971 lbs
Pasture Manure-	25,447 lbs	17,310 lbs
Total-	**48,740 lbs**	**34,511 lbs**

Exported Nutrients:	N Exported (lbs) after Losses	P_2O_5 Exported (lbs) after Losses
Solid Manure-	275 lbs	186 lbs
Liquid Manure-	28,658 lbs	13,747 lbs
Total-	**28,933 lbs**	**13,933 lbs**

Crop Nutrient Removal:	N Utilized (lbs)	P_2O_5 Utilized (lbs)
Total-	**44,074 lbs**	**13,927 lbs**

Net Nutrients:	Nutrients Generated after Losses(lbs.)	Nutrients Removed by Crop and Exported after Losses (lbs)	Net Nutrient Balance after Losses (lbs)
Nitrogen (N)-	48,740 lbs	73,007 lbs	-24,267 lbs
Phosphate (P_2O_5)-	34,511 lbs	27,860 lbs	6,651 lbs

System Losses:	Nutrients Generated (lbs)	Nutrients Remaining after Losses (lbs)	Nutrients Lost in System (lbs)
Nitrogen (N)-	96,026 lbs	48,740 lbs	47,287 lbs
Phosphate (P_2O_5)-	37,531 lbs	34,511 lbs	3,020 lbs

GENERAL INFORMATION

EMERGENCY RESPONSE PLAN

In Case of an Emergency Storage Facility Spill, Leak or Failure

Implement the following first containment steps:

a. Stop all other activities to address the spill.
b. Stop the flow. For example, use skid loader or tractor with blade to contain or divert spill or leak.
c. Call for help and excavator if needed.
d. Complete the clean-up and repair the necessary components.
e. Assess the extent of the emergency and request additional help if needed.

In Case of an Emergency Spill, Leak or Failure during Transport or Land Application

Implement the following first containment steps:

a. Stop all other activities to address the spill and stop the flow.
b. Call for help if needed.
c. If the spill posed a hazard to local traffic, call for local traffic control assistance and clear the road and roadside of spilled material.
d. Contain the spill or runoff from entering surface waters using straw bales, saw dust, soil or other appropriate materials.
e. If flow is coming from a tile, plug the tile with a tile plug immediately.
f. Assess the extent of the emergency and request additional help if needed.

Contacts to be made by the owner or operator within 24 hours

Organization	Phone Number
Oregon Dept. of Agriculture Natural Resources Division 635 Capitol St., N.E. Salem, OR 97301-2532	(503) 986-4700 TTD (503) 986-4762
Oregon Emergency Response (System OERS)	(800) 452-0311
County Environmental Health Department	(503) 842-3943
County Roads Department	(503) 842-3419

Be prepared to provide the following information:

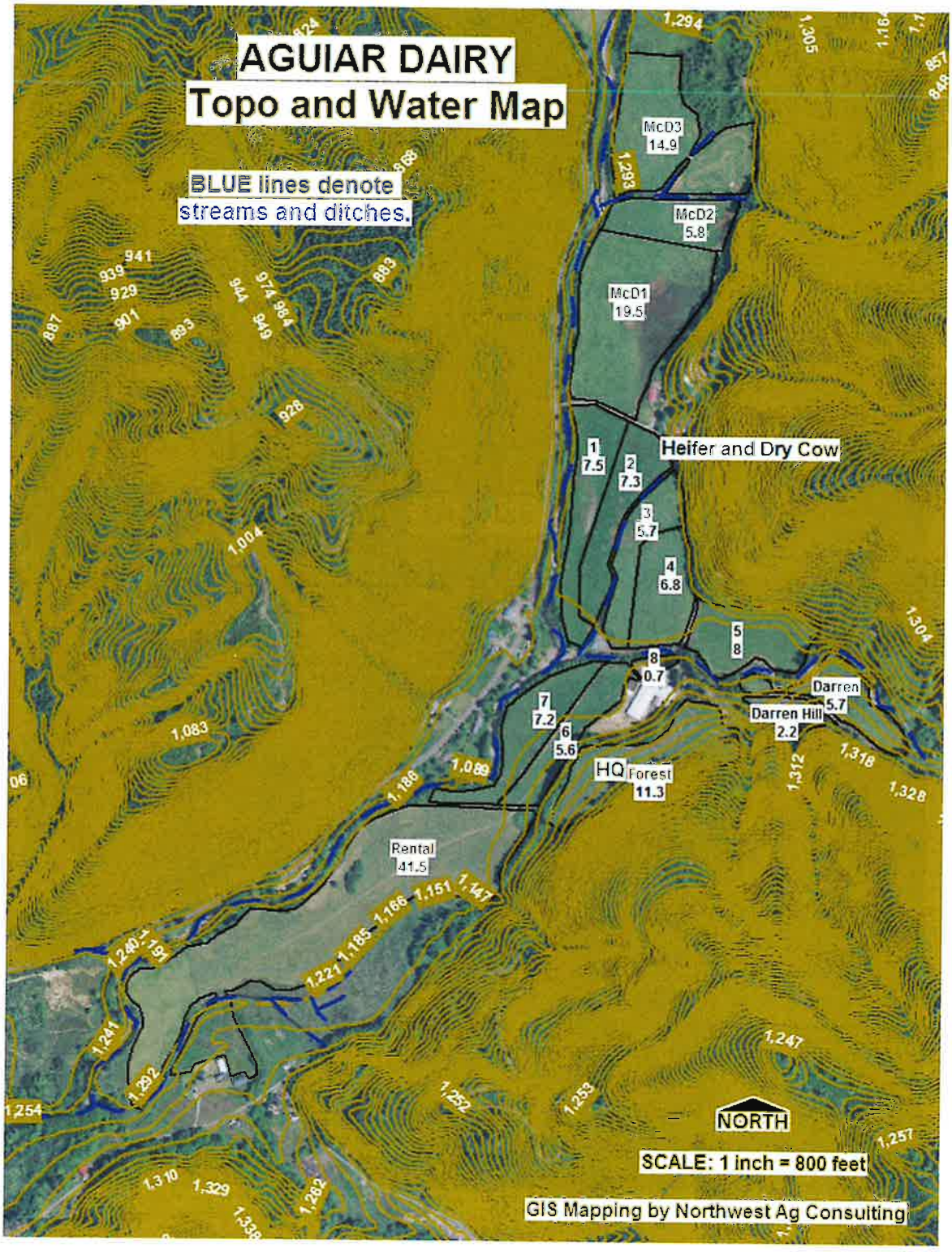
a. Your name and contact information.
b. Farm location (driving directions) and other pertinent information.
c. Description of emergency.
d. Estimate of the amounts, area covered, and distance traveled.
e. Whether manure has reached surface waters or major field drains.
f. Whether there is any obvious damage: employee injury, fish kill, or property damage.
g. Current status of containment efforts.

GENERAL INFORMATION

LOCATION MAP FOR AGUIAR DAIRY

GENERAL INFORMATION

TOPOGRAPHY MAP FOR AGUIAR DAIRY



PRODUCTION AREA

ANIMAL NUMBERS

Aguiar Dairy is currently permitted for 300 dairy animals and is planning to have a maximum of 385 animals on this farm. The planned number of animals for Aguiar Dairy consists of 275 milking and dry cows and 110 heifers and calves. A request for modification of permitted animal numbers is in Section 5.

This plan was written based on 385 dairy livestock and land base described herein.

ANIMAL MORTALITY MANAGEMENT

Currently animal mortalities for the Aguiar Dairy are being disposed of by a service provided by the Tillamook Creamery Association. Other approved methods of dealing with mortalities may be employed by Aguiar Dairy as needed.

Having dead animals sent to an acceptable disposal site is the best method to deal with animal mortalities. A list of landfills and phone numbers can be found on the internet at http://www.deq.state.or.us/lq/sw/disposal/permittedfacilities.html. If a local landfill is not permitted to accept animal carcasses, the Oregon Department of Environmental Quality (DEQ) may grant an exception. Phone numbers to local DEQ offices can be found in most phone books or on the internet at http://www.deq.state.or.us/about/locations.html.

Under no circumstances are animal mortalities to be disposed of in any type of liquid manure storage facility.

COLLECTION OF MANURE, PROCESS WATER AND RUNOFF

Manure, bedding and wasted feed is collected in the barns. The estimated volume of Manure bedding and wasted feed that will be collected annually was generated using the ORAWM workbook located in Section 5.

All process water from the dairy operation is directed to catch basins that drain to wastewater collection facilities. The estimated volume of process water that will be collected annually was generated using the ORAWM workbook located in Section 5.

TREATMENT FACILITIES

There are no treatment facilities at this dairy.

STORAGE FACILITIES

The wastewater collection and storage facilities are shown on the Production Area Map on page 2-8. Capacities and estimate volumes to store for the waste storage facilities can be found on the Manure Storage and Nutrient Balance Summary on page 1-5.

TRANSFER OF MANURE, PROCESS WATER AND RUNOFF

Wastewater, manure, bedding and wasted feed from the livestock barns is directed to the central collection facility where it is temporarily stored until it can be transferred to the wastewater storage tanks. Solids collected in the dry pack areas are periodically transferred to the solids storage area shown on the Production Area Map on page 2-8.

PRODUCTION AREA

Wastewater stored in the wastewater storage tanks is pumped to the hay and pasture land fields using underground pipelines or transferred by tank wagon to be utilized as a source of nutrients. Traveling big gun irrigation systems or tank wagon are used to apply the wastewater to the hay and pasture land fields.

Solids stored in the solids storage area are hauled to the crop land fields and applied using a solids spreader to be utilized as a source of nutrients.

PRODUCTION AREA

OPERATION AND MAINTENANCE CONSIDERATIONS

WASTEWATER STORAGE TANKS-

The wastewater storage tanks shown on the Production Area Map on page 2-8 are used to store wastewater containing manure generated by the Aguiar Dairy. The storage capacity and estimated storage period for the waste storage tanks are shown on the Manure Storage and Nutrient Balance Summary worksheet located on page 1-5. Emptying of the waste storage tanks should begin in the spring and continue through the spring and summer months as weather conditions permit applying wastewater in accordance with the guidance given in Section 3, Manure Utilization. To function properly and have the greatest management flexibility, the waste storage tanks must be as empty as possible in the fall before the fall and winter rainy season begins. Any annual buildup of solids in the waste storage tanks must be removed to maintain design capacity and applied to land application areas in accordance with guidance given in Section 3, Manure Utilization.

Inspect all tanks weekly to insure structural integrity. If the structural integrity of a tank is compromised, immediately empty the tank to determine the cause and make necessary repairs before putting the tank back into service. Do not allow equipment that exceeds the design limit of the tanks on or within 20 feet of the structure.

Inspect all uncovered tanks on a biweekly basis to insure at least 6 inches of freeboard is being maintained to accommodate excess rainfall such as a 25 year-24hour storm and prevent overtopping of the tank.

Keep pumps, agitators, piping, valves and all other electrical and mechanical equipment in good condition by following the manufacturer's recommendations. Maintain grounding rods and wiring for all electrical equipment in good condition. Immediately remove all foreign debris within the structure that may cause damage to pumps or agitators.

Pump the wastewater storage tanks completely empty during the summer months and cleanout any debris and other solid materials that may have accumulated in the tanks. Inspect the tanks for structural damage and if structural damage to a tank is discovered seek the services of a qualified engineer to assess the damage and recommend necessary repairs before putting the tank back into service. Follow the guidance given in Section 3, Manure Utilization, when applying wastewater to fields.

Do not dispose of animal carcasses in any wastewater storage tank. It is against the law to do so.

Maintain all fences, railings, and/or warning signs to provide warning and/or prevent unauthorized human or livestock entry. Immediately repair vandalism, vehicular or livestock damage to the structure, earthen areas surrounding the structure, or any appurtenances. Maintain lids, grates and shields on openings.

Provide proper ventilation before entering the tank, for any reason what so ever. Provide and use self - contained breathing apparatus (scuba) equipment when entering a tank. No persons should enter the tank unless safety ropes are used and someone else capable of providing rescue assistance is outside the tank.

Do not assume any tank, including open top tanks, are well ventilated.

PRODUCTION AREA

SOLIDS STORAGE FACILITIES-

The solids storage facilities shown on the Production Area Map on page 2-8 are used to store solids containing manure generated by the Aguiar Dairy. The storage capacity and estimated storage period for the solids storage facilities are shown on the Manure Storage and Nutrient Balance Summary worksheet located on page 1-5. Emptying of the solids storage facility should begin in the spring and continue through the spring and summer months as weather conditions permit applying solids in accordance with the guidance given in Section 3, Manure Utilization. To function properly and have the greatest management flexibility, the solids storage facilities must be as empty as possible in the fall before the fall and winter rainy season begins.

Periodically inspect concrete and asphalt slabs, walls and curbs and repair or replace broken sections as needed. Cleanup any spillage of manure and organics from outside of the solids storage area and place them back in the solids storage facility.

Maintain all fences, railings, and/or warning signs to provide warning and/or prevent unauthorized human or livestock entry. Immediately repair vandalism, vehicular or livestock damage to the structure, earthen areas surrounding the structure, or any appurtenances.

BUILDING ROOFS-

Inspect building roofs annually as a minimum. Repair and/or replace all rusted sections and secure loose sections as needed. Immediately replace all broken trusses, rafters, beams, poles as needed. Immediately determining the cause and necessary modification(s) to prevent reoccurring structural failure is essential.

FENCES-

Do not allow livestock access to open water courses and drainageways. Provide off stream watering facilities where possible and limit access to designated watering areas.

Inspect fences periodically and repair or replace broken or decayed posts and tighten sagging wire as needed. Broken wire can be spliced or replaced. Replace broken or missing insulators on electric fences as needed and repair or replace inoperative electric fence controllers.

Insure gates and other appurtenances are in good working order. Replace or repair components as needed.

IRRIGATION SYSTEMS-

Maintain sprinkler irrigation systems in accordance with the manufacturer's recommendations to help ensure trouble free operation. Prevent livestock access to equipment during operation.

Clean plugged nozzles and replace if worn or defective.

Promptly repair all leaks by replacing valves, fittings, gaskets, worn or damaged parts.

PRODUCTION AREA

Prompt repair or replacement of damaged or worn components is necessary. Check to make sure all application components i.e. water control structures, gates, valves, ditches, etc. are functional and are in good operating condition.

Maintain screening and filtering facilities.

Maintain vigorous vegetative growth where applicable.

LIVESTOCK WATERING FACILITIES-

Check all above ground connections, valves, gates, rodent guards, inlets and outlets to make sure they are functioning properly. Check troughs and tanks for leaks or cracks and repair or replace immediately, if necessary.

Make certain the area adjacent to the trough is well protected with gravel, paving, or good cover. Be sure that the outlet pipe has a free outlet and is not causing any serious erosion problems. Check periodically to see if debris has fallen into the trough or tank which may restrict inflow or planned functions of the outflow system.

Clean the entire system periodically and remove moss, algae growth, and/or sludge. Chemicals such as copper sulfate and chlorine can be used to prevent moss and algae growth. Local rules and regulations are to be followed when using chemicals to make sure they are safe for animals.

Where necessary maintain coverings and insulation to prevent damage by freezing.

Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.

Immediately repair any vandalism, vehicular or livestock damage.

PIPELINES-

Flush pipelines used for liquid waste applications with clean water following waste application, or as needed, to prevent particle buildup.

Drain the pipeline and components in areas that are subject to freezing. If parts of the pipeline cannot be drained, a non-toxic antifreeze solution may be added.

Check to make sure all valves and air vents are set at the proper operating condition so they can provide protection to the pipeline.

Inspect pipelines for signs of failure. Inspect risers and valves periodically for leaks or worn gaskets. Repair or replace pipeline, risers and valves as needed.

Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.

PUMPS-

Operate and maintain pumps in accordance with good judgment and manufacture's manuals and recommendations.

Drain liquid manure from pumps during cold weather to prevent freezing. If parts of the system cannot be drained, a non-toxic antifreeze solution may be added.

PRODUCTION AREA

Inspect pumps periodically and remove debris wrapped around shafts and impellers. Maintain foot valves and check valves for proper operation.

For proper operation of electric motors and controls, maintain lubrication for all bearings, keep electric panel free from obstructions and debris. Maintain electrical safety devices, assure all electrical contacts are tight, and lock main electrical switch to "OFF" position during non-use season. Maintain adequate shade and ventilation for pump motors.

For proper operation of pumps, maintain lubrication for all bearings and pump shafts, assure belts are adjusted properly, maintain safety covering devices on open shafts and belt drives, check to make sure all safety valves and devices are set at proper operating conditions so they may provide protection to the pump and power unit. For centrifugal pumps, periodically measure tolerance between pump impeller and pump casing (i.e. wearing) and replace wear ring as needed to help restore new pump operating characteristics.

Use portable pressure gauge (preferably a liquid filled gauge) to monitor pump performance.

Operate and maintain agitators in accordance with the manufacture's manual and recommendations. Inspect all plumbing annually as a minimum.

Replace, tighten, or repair broken or loose connections and lines as needed.

WELL(S)-

Protect the area immediately surrounding the well from being damaged by agriculture machinery, vehicles, or livestock.

All fences, railings, and/or warning signs shall be maintained to provide warning and/or prevent unauthorized human or livestock entry.

Do not allow any foreign debris to accumulate and maintain soil and vegetative covering in the immediate vicinity of the well.

Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage caused by their activity.

Check metal surfaces for rust and other damage especially sections in contact with earthfill and with other materials. Repair or replace damaged section and apply paint as a protective covering.

Keep all surface water from entering or accumulating at the immediate vicinity of the well site.

Immediately repair any vandalism, vehicular, or livestock damage.

PRODUCTION AREA

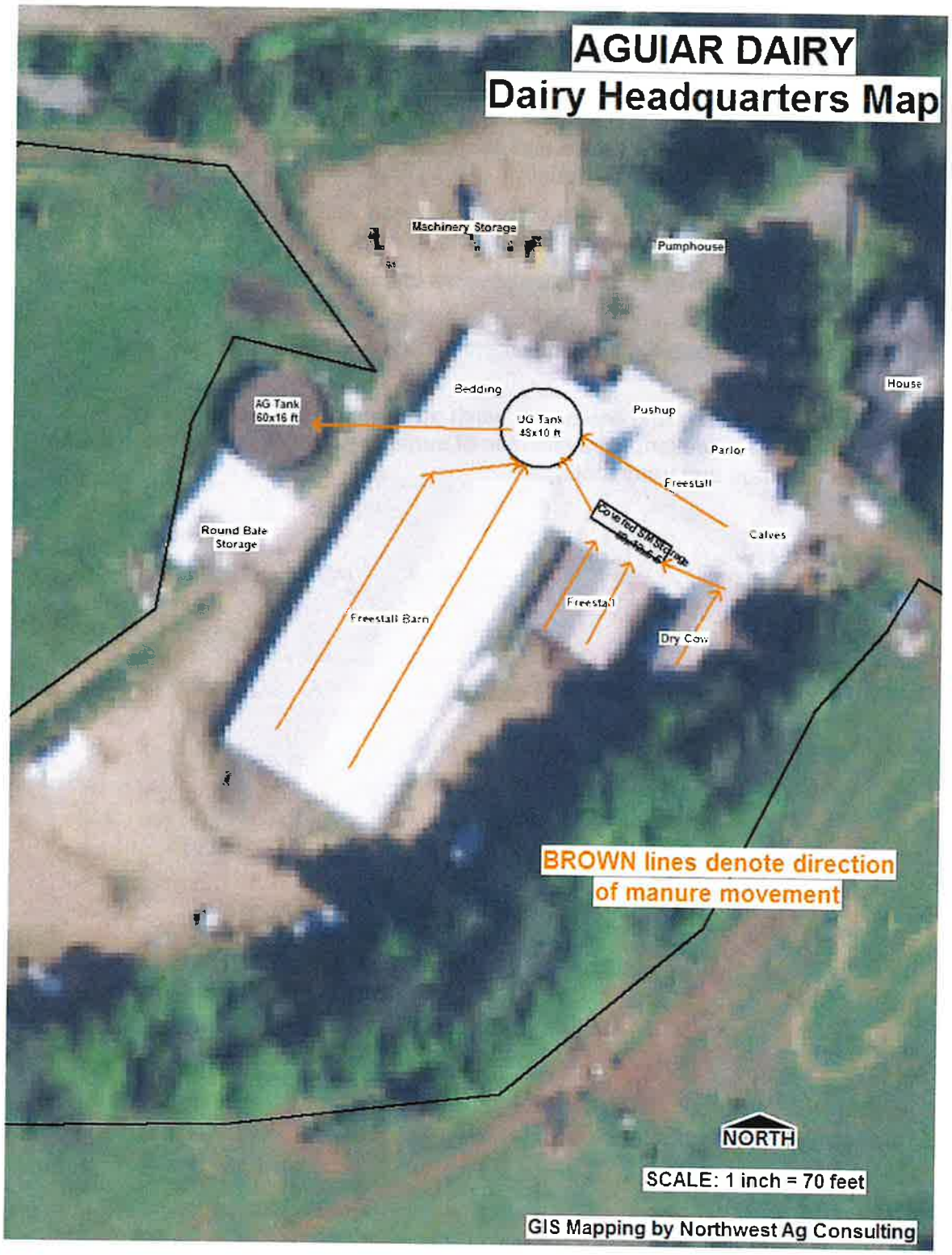
CHEMICAL HANDLING CHECKLIST-

The following measures shall be taken to prevent chemicals from contaminating process water or storm water storage and treatment systems:

1. Make sure all chemicals are stored in proper containers. Expired chemicals and empty containers are to be properly disposed of in accordance with state and federal regulations. Pesticides and associate refuse are to be disposed of in accordance with the FIFRA label.
2. Chemical storage areas are to be self-contained with no drains or other pathways that will allow spilled chemicals to exit the storage area.
3. Chemical storage areas are to be covered to prevent chemical contact with rain or snow.
4. Emergency procedures and equipment are to be in place to contain and clean up chemical spills.
5. Chemical handling and equipment wash areas are to be designed and constructed to prevent contamination of surface waters, waste water, and storm water storage and treatment systems.

PRODUCTION AREA

PRODUCTION AREA MAP FOR AGUIAR DAIRY



PRODUCTION AREA

PRODUCTION AREA

MANURE UTILIZATION

CROPPING SYSTEM

The acres of crop land area available for utilization of the nutrients and organics contained in the wastewater and solids produced from the Aguiar Dairy is shown on the utilization worksheet in ORAWM located in Section 5. Yield data and nutrient utilization rates for the crops grown are also shown on the inventory worksheet in ORAWM located in Section 5.

Irrigated and nonirrigated crop yield data from the Natural Resources Conservation Service Soil Survey referenced in Section 5 indicates the yield data used in developing this plan is within the range of the given crop yields for the Aguiar Dairy.

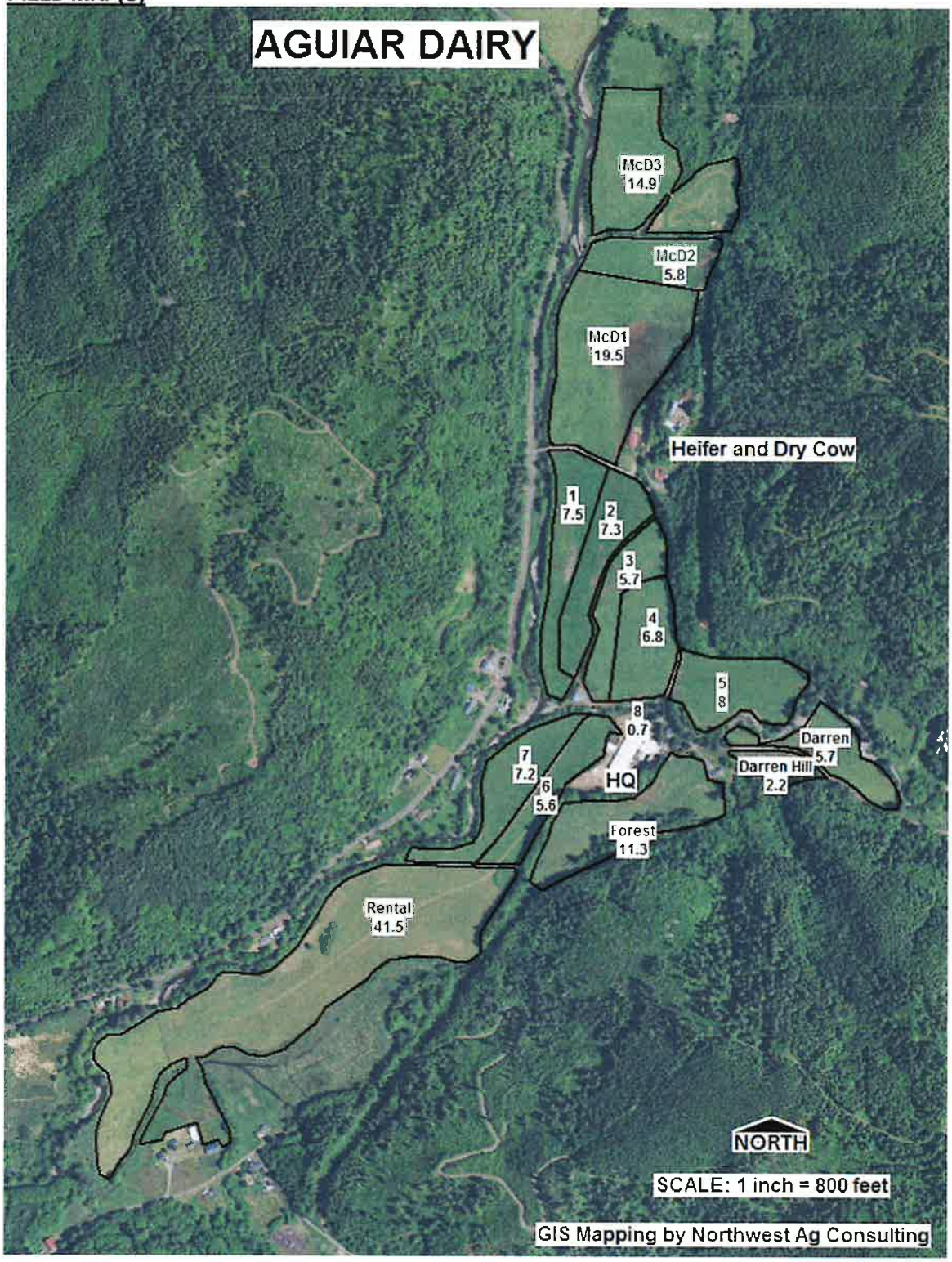
Traveling big gun irrigation systems are used to irrigate and apply wastewater containing manure and other organics produced from the Aguiar Dairy. These systems use single large sprinkler nozzles usually mounted on a cart with wheels that is attached to a high density polyethylene pipeline that is rolled up on a large reel that provides a constant travel speed for the sprinkler. These systems apply water depending on the nozzle size, operating pressure and travel used and have an efficiency of 65 to 75 percent. Traveling big gun sprinkler systems must be well managed to prevent excess percolation, surface runoff, wind drift and evaporation losses.

Other types of irrigation systems that will be used to irrigate the crops must be well managed to prevent excess percolation, surface runoff and erosion, wind drift and evaporation losses.

The amount of irrigation water to apply based on the net irrigation requirements for the crop being grown can be found in the tables starting on page 3-30.

MANURE UTILIZATION

FIELD MAP(S)



MANURE UTILIZATION

APPLICATION

The manure and irrigation application systems will be calibrated in accordance with guidance starting on page 3-3 to insure the applications of manure, bedding and runoff from the waste storage facilities are in accordance with agronomic rates.

No application of wastewater or solids containing manure is to be made to the field buffer areas shown on the Setback Map on page 3-7. Applications of wastewater and solids containing manure should be made in accordance with guidance starting on page 3-3 to reduce the risk of contaminated runoff to surface water sources and leaching of contaminants to ground water sources.

The phosphorus runoff rating for each of the farm fields is based on the Western Oregon Phosphorus Index and is shown in the table on page 4-34. Wastewater, solids and commercial fertilizer for any field with a high runoff rating must be applied on a phosphorus basis. Wastewater, solids and commercial fertilizer for any field with a low or medium runoff rating can be applied on a nitrogen basis. No applications of manure or commercial fertilizer containing phosphorus are to be made on a field with a very high phosphorus runoff rating.

GENERAL CONSIDERATIONS FOR MAKING MANURE APPLICATIONS

Manure applications may be made at any time of the year provided certain factors have been considered. However, the overriding factor one should use in considering whether or not to apply nutrients to a crop, irrespective of the nutrient source, is the agronomic need of the crop at the time of application. The following guidelines are to be considered once the decision has been made to make a manure application.

- **Consider using T-Sum 200 to determine when manure applications are to begin** as long as you can comply with all other permit and nutrient management requirements. Calculations for T-Sum 200 are outlined in OSU Extension Fertilizer Guide for Pastures (OSU FG63, 2000). T-Sum 200 is based on accumulated heat units and is an accurate guide to estimate plant activity. Research has shown that T-Sum 200 is the earliest date when plant roots begin to grow in the spring and thus are receptive to applied nutrients.

  Surface air temperature is monitored and the daily minimum and maximum air temperatures are summed and divided by two to get the average daily air temperature then converted to centigrade (F degrees minus 32 times 0.556). Manure applications may begin once 200 heat units have been accumulated. The average date of T-Sum 200 for Aguiar Dairy is January 30 for the 30 year average from 1981-2010. However, one must still apply manure at agronomic rates based on the estimated growth potential of the crop and anticipated climatic events.

  Based on crop nutrient uptake patterns, manure applications should stop when the crop is done growing for the year and before the first significant rainfall event that is expected to result in saturated soils or surface runoff.

MANURE UTILIZATION

- **Fields that are subsurface (TILE) drained require additional precautions** when manure is applied. Any pre-application tillage should leave as much residue as possible on the soil surface. Water control structures installed in subsurface drainage systems should be managed to prevent discharge of manure and wastewater during periods of application.
- **Be aware of the location of sensitive areas, concerns of neighbors or concerns of the public**, which require special application procedures. To reduce odor problems, apply wastewater and solids containing manure in mid-morning when temperatures are warming and air is rising rather than in the afternoon or evening when air is cooling and settling. Avoid applications during periods of fog.
- **Calibrate application equipment** to insure uniform distribution and accurate application rates in accordance with guidance given in the Considerations for Manure Applications starting on page 3-6. Refer to page 3-17 for guidance on the calibration of application equipment.
- **Maintain setbacks for manure application from any surface waters.** The management goal is to allow no manure to enter surface waters at any time. The following table shows minimum setback requirements for manure applications:

Manure type	Application Equipment	Season	
		Wet	Dry
Liquid	Big gun	100 feet	35 feet
Liquid	Tank Wagon	35 feet	10 feet
Solid	Spreader	35 feet	35 feet

Note:

a. Setbacks are the distance between open waterways and manure application area.
b. Setback requirements will generally increase for manures which are applied aerially (such as a traveling big gun) versus manures applied lower to the ground (such as a splash bar) due to potential for drift from wind or splashing.

- **Record applications, transfers or exports of nutrients (manure and fertilizer)** and maintain them for at least 5 years. The CAFO Recordkeeping Calendar or the tools and forms referenced in Section 5 may be used to record this information.

MANURE UTILIZATION

MANURE UTILIZATION

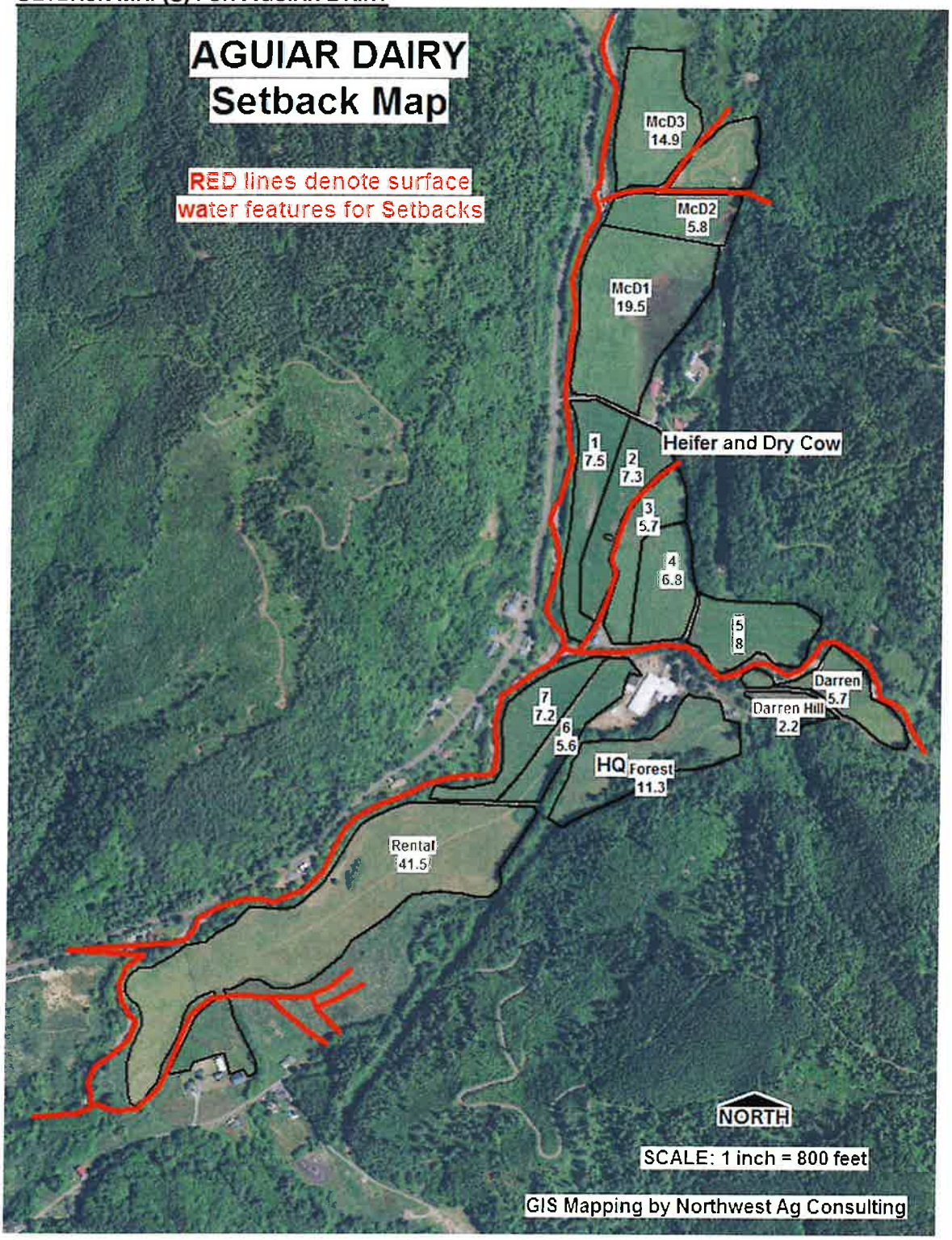
CONSIDERATIONS FOR DRY SEASON MANURE APPLICATIONS:

Apply wastewater and solids containing manure at **agronomic rates** shown on the table on page 3-21 using the following guidelines:

- Consider using T-Sum 200 as a guideline to begin making manure applications.
- Apply to land being prepared for crops and till manure into soil within 3 days of application if possible or apply to actively growing crops such as grass, clover or alfalfa.
- ***Do not apply*** during rainfall events that are expected to result in saturated soils or surface runoff.
- ***Maintain the setback buffer distances*** described on page 3-4 and shown on the Setback Map on page 3-7 when making applications of liquids or solids containing manure.
- ***Record applications, transfers or exports*** of nutrients (manure and fertilizer) and maintain them for at least 5 years. The CAFO Recordkeeping Calendar or the tools and forms referenced in Section 5 may be used to record this information.

MANURE UTILIZATION

SETBACK MAP(S) FOR AGUIAR DAIRY



MANURE UTILIZATION

CONSIDERATIONS FOR WET SEASON MANURE APPLICATIONS:

Only apply manure during this time period if the following guidelines CAN be met. Call the ODA CAFO Program at (503) 986-4700 for guidance if a manure application is needed and the following guidelines CAN NOT be met:

- Apply manure only to actively growing crops such as grass, clover or alfalfa.
- Minimize application rates by using the maximum travel rates for the application equipment.
- ***Maintain the setback buffer distances*** described in the table on page 3-4 and shown on the Setback Map on page 3-7 when making applications of liquids or solids containing manure.
- ***Do not apply*** during rainfall events that are expected to result in saturated soils or surface runoff.
- ***Do not apply*** to saturated or flooded soils. It is recommended that application(s) be limited to soils (areas) where the flooding frequency class rating is None, Very Rare or Rare.
- ***Do not apply*** to slopes greater than 5%. See the Soil Map in Section 4 for the location of soil map units with slopes greater than 5%.
- ***Applications of wastewater or solids containing manure to frozen soils should be avoided***. Do the following if an application of wastewater or solids containing manure is to be made to frozen soils:
  - Apply only enough wastewater or solids containing manure to address storage limitations until suitable soil conditions for application are available.
  - Minimize applications to 5 wet tons per acre or less of solids containing manure and 6,788 gallons (0.25 inches) per acre or less of wastewater.
  - Apply to alternating strips to reduce the risk of contaminated runoff reaching surface water sources.
  - Apply to fields of established hay, pasture or fields containing at least 90% cover and are the furthest from open water sources.
  - Do not apply wastewater or solids containing manure within 200 feet of surface water sources, drainageways, wells, or inlets to subsurface drainage systems.
  - Runoff control systems such as earthen dikes must be in place where applications will be made to fields with slopes greater than 5%.
- ***Record applications, transfers or exports*** of nutrients (manure and fertilizer) and maintain them for at least 5 years. The CAFO Recordkeeping Calendar or the tools and forms referenced in Section 5 may be used to record this information.
- ***Do not apply*** manure or commercial fertilizer to fields receiving applications unless the nutrients applied in the manure are less than the annual application of nutrients planned in the nutrient budget for the fields.

MANURE UTILIZATION

MANURE AND SOIL SAMPLING FREQUENCY

If no samples of liquids and solids containing manure have been taken, take a sample of liquids and solids during applications in early spring **once a year for three consecutive years** to develop a cumulative manure analysis history as a basis for nutrient allocation to the fields. If there is a sampling history of liquids and solids containing manure, take a sample of liquids and solids during applications in early spring **once every 5 years or whenever a significant change in animal numbers or in the manure handling system occurs.** Have each sample analyzed for Total Nitrogen (TKN), Ammonium Nitrogen (NH_4-N), Phosphorus (P) and Potassium (K) plus percent moisture. Ask the lab to report results in pounds per ton for the solids containing manure and in pounds per thousand gallons for liquids containing manure. Analyses of solids and liquids containing manure should be performed by a laboratory that meets the requirements and performance standards of the Manure Testing Laboratory Certification Program (MTLCP), http://www.mda.state.mn.us/licensing/pestfert/manurelabs.htm.

Collect soil samples from all fields receiving solids or liquids containing manure **within a 5 year period** in the fall (September 15-October 15) in accordance with **Pacific Northwest (PNW) Extension publication 570-E, "Monitoring Soil Nutrients Using a Management Unit Approach"** referenced in Section 5. Have the soil samples analyzed for Total Nitrogen (TKN) and Phosphorus (P) and ask the lab to report results in parts per million (ppm). Soil test analyses should be performed by laboratories that meet the requirements and performance standards of the North American Proficiency Testing Program (NAPT) Proficiency Assessment Program (PAP); http://www.naptprogram.org/pap/.

HOW TO SAMPLE LIQUID MANURE

Obtain a composite following one of the procedures listed below and thoroughly mix. Using a plunger, an up-and-down action works well for mixing liquid manure in a five-gallon bucket. Fill a one-quart plastic bottle not more than three-quarters full with the composite sample. Store sample in freezer if not delivered to the lab immediately.

Procedure 1. Sampling from storage- Agitate storage facility thoroughly before sampling. Collect at least five samples from the storage facility or during loading using a five-gallon bucket. Place a sub sample of the composite sample in a one-quart plastic container. Sampling a liquid manure storage facility without proper agitation (2-4 hrs. minimum) is not recommended due to nutrient stratification, which occurs in liquid systems. If manure is sampled from a lagoon that was not properly agitated, typically the nitrogen and potassium will be more concentrated in the top liquid, while the phosphorus will be more concentrated in the bottom solids.

Procedure 2. Sampling during application- Place buckets around field to catch manure from spreader or irrigation equipment. Combine and mix samples into one composite sub sample in a one-quart plastic container.

MANURE UTILIZATION

How to Sample Solid Manure

Collect a composite sample by following one of the procedures listed below. A method for mixing a composite sample is to pile the manure and then shovel from the outside to the inside of the pile until well mixed. Fill a one-gallon plastic heavy-duty zip lock bag approximately one-half full with the composite sample, squeeze out excess air, close and seal. Store sample in freezer if not delivered to the laboratory immediately.

Procedure 1. Sampling while loading - Recommended method for sampling from a stack or bedded pack. Take at least ten samples while loading several spreader loads and combine to form one composite sample. Thoroughly mix the composite sample and take an approximately one pound sub sample using a one-gallon plastic bag. Sampling directly from a stack or bedded pack is not recommended.

Procedure 2. Sampling during spreading - Spread a tarp in field and catch the manure from one pass. Sample from several locations and create a composite sample. Thoroughly mix the composite sample together and take a one-pound sub sample using a one-gallon plastic bag.

Procedure 3. Sampling daily haul - Place a five-gallon bucket under the barn cleaner 4-5 times while loading a spreader. Thoroughly mix the composite sample together and take a one-pound sub sample using a one-gallon plastic bag. Repeat sampling 2-3 times over a period of time and test separately to determine variability.

Procedure 4. Sampling poultry in-house - Collect 8-10 samples from throughout the house to the depth the litter will be removed. Samples near feeders and waterers may not be indicative of the entire house and sub samples taken near here should be proportionate to their space occupied in the whole house. Mix the samples well in a five-gallon pail and take a one-pound sub sample, place it in a one-gallon zip lock bag.

Procedure 5. Sampling stockpiled litter - Take ten sub samples from different locations around the pile at least 18 inches below the surface. Mix in a five-gallon pail and place a one-pound composite sample in a gallon zip lock bag.

Sample Identification and Delivery

Identify the sample container with information regarding the farm, animal species and date. This information should also be included on the sample information sheet along with application method, which is important in determining first year availability of nitrogen.

Keep all manure samples frozen until shipped or delivered to a laboratory. Ship early in the week (Mon.-Wed.) and avoid holidays and weekends.

MANURE UTILIZATION

MANURE TESTS

Aguiar Dairy — **LIQUID MANURE ANALYSIS**

Testing performed by AgSource Labs, Umatilla, Oregon

Year / Lab #	Date	Sample I.D.	Lbs/1,000 gallons				%	%
			Total N	P_2O_5	K_2O	NH_4-N	Moisture	Solids
2015								
M5690	5/4/2015	Tanks	20.4	9.8	26.8	11.1	95.76	4.24

Aguiar Dairy — **SOLID MANURE ANALYSIS**

Testing performed by AgSource Labs, Umatilla, Oregon

Year / Lab #	Date	Sample I.D.	Lbs/Ton				%	%
			Total N	P_2O_5	K_2O	NH_4-N	Moisture	Solids
2015								
M5689	5/4/2015	Solids Stack	8.1	5.5	20.1	2.1	77.11	22.89

Manure analyses should be performed by a laboratory that meets the requirements and performance standards of the Manure Testing Laboratory Certification Program (MTLCP), http://www.mda.state.mn.us/licensing/pestfert/manurelabs.htm.

Manure should be analyzed annually for a minimum of three (3) consecutive years to develop a cumulative manure analysis history as a basis for nutrient allocation to the fields.

MANURE UTILIZATION

MANURE UTILIZATION

How to Sample Soils

Current soil tests must be used in the development and editing of nutrient management plans. A current soil test is one that is no older than 5 years that is used to represent the nutrient status of the entire field. Soil analysis must be performed by laboratories successfully meeting the requirements and performance standards of the North American Proficiency Testing Program-Performance Assessment Program (NAPT-PAP). Results of these analysis will be used to determine application rates for manure, litter, and process wastewater. Guidance for soil sampling can be found in the Pacific Northwest (PNW) Extension publication 570-E, "Monitoring Soil Nutrients Using a Management Unit Approach". Oregon State University Extension Publication EC1478, "Soil Test Interpretation Guide" provides guidance on how to determine soil nutrient concentrations and how to adjust soil pH to improve nutrient availability.

Field Area. A composite soil sample should represent a uniform field area. Each area should have similar crop and fertility history. Soil characteristics (color, slope, texture, drainage) should be similar. Exclude small areas within a field that are obviously different. The field area represented by a single composite sample should represent no more than 40 irrigated acres or 100 dry land acres.

Sampling Depth. Laboratory tests are calibrated to specific depths. It is vital to collect samples from appropriate depths. Sampling depth for most soils is the rooting depth in 6-inch intervals. In Oregon, as a minimum, soil samples should be collected from the 0-12" depth and from the 12-24" depth. The 0-6" surface soil samples are normally used for conventional tests of organic matter, nitrogen, phosphorus, potassium, pH and salt levels. Additionally, subsurface samples from the 6-24" depth are needed to estimate nitrogen availability for crops.

Post Harvest Soil Testing for Evaluating Nutrient Applications. Refer to Pacific Northwest (PNW) Extension Publication 570-E, "Monitoring Soil Nutrients Using a Management Unit Approach" in Section 5 for guidance on how to evaluate nutrient applications and crop uptake of nutrients.

MANURE UTILIZATION

MANURE UTILIZATION

SOIL TESTS

Aguiar Dairy **SOIL TEST RESULTS**

Testing performed by AgSource Laboratory, Umatilla, Oregon

Report	Test Date	Field	Depth	NO3-N ppm	NH4-N ppm	P ppm	K ppm	Ca meq	Mg meq	TB meq	pH	SMP	OM %
2015													
S8304	9/17/2015	Field 1	12"	12	14	23	639	19.1	7.2	NA	5.6	5.6	8.6
S8304	9/17/2015	Field 2	12"	12	14	23	639	19.1	7.2	NA	5.6	5.6	8.6
S8304	9/17/2015	Field 3	12"	32	23	29	1007	16.1	7.7	NA	5.4	5.5	11.5
S8304	9/17/2015	Field 4	12"	32	23	29	1007	16.1	7.7	NA	5.4	5.5	11.5
S8304	9/17/2015	Field 5	12"	13	16	50	875	16.5	7.0	NA	5.4	5.3	11.5
S8362	9/22/2015	Field 6	12"	14	34	4	497	4.6	2.5	NA	5.4	5.0	15.1
S8362	9/22/2015	Field 7	12"	9	31	23	805	17.1	6.9	NA	5.6	5.6	6.6
S8362	9/22/2015	Darren	12"	9	23	13	773	16.1	6.2	NA	5.4	5.4	6.4
S8362	9/22/2015	Darren Hill	12"	9	23	13	773	16.1	6.2	NA	5.4	5.4	6.4
S8362	9/22/2015	Forest	12"	13	13	51	959	14.6	5.6	NA	5.7	5.4	17.4
S8362	9/22/2015	McD1	12"	9	13	8	579	14.6	5.6	NA	5.1	5.1	9.1
S8362	9/22/2015	McD2	12"	9	13	8	579	14.6	5.6	NA	5.1	5.1	9.1
S8362	9/22/2015	MCD3	12"	9	13	8	579	14.6	5.6	NA	5.1	5.1	9.1
S8362	9/22/2015	Rental	12"	6	18	9	356	19.1	6.2	NA	5.5	5.4	7.0

Soil test analyses should be performed by laboratories that meet the requirements and performance standards of the North American Proficiency Testing Program (NAPT) Proficiency Assessment Program (PAP); http://www.naptprogram.org/pap/.

MANURE UTILIZATION

MANURE UTILIZATION

HOW TO CALIBRATE APPLICATION EQUIPMENT

Calibration of application equipment is a critical part of nutrient management. Calibration should be completed at least annually to insure manure and fertilizer will be uniformly applied. There are two basic approaches for calibrating a manure spreader – the load area and the weight area methods. The load area method is more accurate and can be used for both liquid and solid manure. The weight area method works only with solid or semi-solid manure.

Irrigation System Calibration

Place 3-5 buckets throughout the irrigation spray pattern and collect samples while operating the pump at a given rpm and pressure (for a traveling gun record the travel speed also). At the end of the planned sample period measure the amount of liquid collected in inches (average the samples). The following chart shows how many gallons per acre applied per inch of liquid applied:

Inches Liquid Manure Applied via Irrigation:	Gallons per Acre:
0.20	5,431
0.30	8,146
0.40	10,862
0.50	13,577
0.75	20,366
1.00	27,154
1.25	33,943
1.50	40,731

Soft Hose Injection System with Irrigation Hose:

Alternative 1. Use a flow meter mounted on the injector system and calculate the distance and width to determine amount applied over a measured area. Example the flow meter measures 1,000 gallons over a distance of 600 feet and 10 feet wide.

Formula:

Application Rate (7,260 gallons/acre) = (Gallons Applied (1,000 gal) X 43,560 sq. ft/acre) divided by (Distance traveled (600 ft) X Application width (10 ft))

Alternative 2. (Requires a 10-20 gallon graduated measuring container)

Step 1) In the field, measure the flow out of one injector for 5 seconds into the graduated measuring container and record gallons, repeat three (3) times and average the results.

Step 2) Multiply the average amount collected from one injector by the number of injectors (equals amount applied for the whole system for 5 seconds).

Step 3) Multiply the results of Step 2 times 12 to get gallons per minute.

Step 4) Place the injector in the soil at the planned depth and operating speed and record the distance traveled in 1 minute (average 3 different measurements).

Step 5) Determine the effective application width (number of injectors X injector spacing in feet).

Step 6) Multiply the effective width times the distance traveled in 1 minute (this gives the square feet covered in 1 minute).

Step 7) Divide the result of Step 6 by 43,560 (this gives the acres covered in 1 minute).

Step 8) Divide the results of Step 3 (gallons per minute) by the results of Step 7 (acres covered in 1 minute) - (this gives the gallons applied per acre.

For example:
Step 1) Collect an average of 6 gallons from one injector for 5 seconds.

Step 2) Applicator has 8 injectors (8 injectors X 6 gallons per injector = 48 gallons for 5 seconds)

Step 3) 48 gallons in 5 seconds X 12 = 576 gallons/minute applied

Step 4) Average distance covered in 1 minute was 250 feet

Step 5) Average width of the applicator is 12 feet.

Step 6) 12 feet wide X 250 feet long = 3000 square feet

Step 7) 3000 square feet divided by 43,560 square feet/acre = .0688 acres covered in 1 minute

Step 8) 576 gallons/minute divided by .0688 acres/minute = 8,372 gallons/acre.

Manure Spreader/Tanker Calibration
There are several methods that can be used to calibrate the application rate of a manure spreader. The two best methods are the load-area method and the weight-area method. It is desirable to repeat the calibration procedure 2 to 3 times and average the results to establish a more accurate calibration.

Before calibrating a manure spreader, the spreader settings such as splash plates should be adjusted so that the spread is uniform. Most spreaders tend to deposit more manure near the middle than at the edge of the spread pattern. Overlapping can make the overall application more uniform. Calibrating application rates when overlapping is involved requires measuring the width of two spreads and dividing by two to get the effective spread width.

Calibration should take place annually or whenever manure is being applied from a different source or consistency.

MANURE UTILIZATION

Load-Area Method:
The load-area method is the most accurate and can be used for both liquid and soild manure. The load area method is a 3-step process:

Step 1) Determine the amount of manure in the spreader. The most accurate way to determine the amount of manure in a spreader is weighting the spreader when it is empty and again when it is full. For a reliable estimate of spreader capacity, weigh several representative loads (at least five) to determine the average gross weight. Subtract the empty spreader weight. Then, calculate the average net loaded weight.

Step 2) Determine the area of spread using the method at the right. Width measurements near the beginning and end of the spread pattern should be avoided because the spreader may not be operating at full capacity.

Step 3) Calculate the application rate. The application rate is calculated using the formula for either liquid or solid manure.

> **Formula for Solid Manure Equals Tons/Acre**
> (Average Loaded Weight (lbs) x 21.81) divided by (Distance Traveled (ft) x Width of Spread (ft))
>
> **Formula for Liquid Manure Equals Gal/Acre**
> (Tank Volume (gal) x 43,560) divided by (Distance Traveled (ft) x Width of Spread (ft))

Weight-Area Method:
The weight-area method can only be used with solid or semi-solid manure. When a scale is not available, the application rate of a box spreader can be determined by collecting manure on a tarp or piece of heavy material. The weight area method is less accurate than the load area method.

This method consists of eight steps:
Step 1) Prepare/cut three 56-inch square tarps or pieces of heavy material (this size equals 1/2,000 of an acre). The pounds of manure collected on 56 inches square equals tons applied per acre.

Step 2) Weigh one of the clean tarps and a large bucket on a platform scale. Record the weight.

Step 3) Anchor the three tarps in the field ahead of the spreader near the beginning, middle, and end of the area that will be spread with one load.

Step 4) Drive over the three tarps at a normal speed to collect a representative manure sample.

Step 5) Fold and place the first tarp into the empty bucket without spilling the manure. Weigh the bucket, tarp, and manure. Subtract the weight of the clean tarp and bucket recorded in step 2.

MANURE UTILIZATION

Step 6) Repeat the process for each of the two remaining tarps.
Calculate the average weight (pounds) of the manure collected. This value equals tons of manure applied per acre.

Factor for converting pounds to tons and square feet to acres (21.8 = 43,560 sq ft per acre divided by 2,000 lbs/ton).
The factor for converting square feet to acres = 43,560 sq ft per acre.

Step 7) Determining Area of Spread.
The "area of spread" is the length and width of the ground covered with one load of manure. The area of spread is affected by speed and equipment settings. Spreaders discharge manure at varying rates depending on travel and PTO speed, gear box settings, and discharge openings. It is important to adjust the spreader so the pattern is as uniform as possible. Accurately measuring the length and width of this area is essential. To determine width, measure two adjacent spreads and divide by two to find the "effective" spread width. This accounts for overlap, which is often needed for a more uniform application. The length of spread is determined using the following three values:

1. Desired manure application rate based on soil and manure tests,
2. Width of the manure spread, and
3. Manure spreader holding capacity (weight and/or volume).

From these values, calculate the distance or lengths of spread using these formulas:

Formula: Solid Manure Equals Feet/Load
(Average Load Weight (lbs) x 21.81) divided by (Spread Width (ft) x App. Rate (tons/ac))

Formula: Liquid Manure Equals Feet/Load
(Tank Volume (gal) x 43,560) divided by (Spread Width (ft) x Desired App. Rate (gal/ac))

Step 8) Spread a load. If the distance traveled does not equal the calculated distance, adjust the speed or equipment settings.

MANURE UTILIZATION

AMOUNT OF MANURE TO APPLY FOR CROPS GROWN

The timing and frequency of applications of wastewater and solids containing manure for utilization by crops shown in the table below are based on information provided in Oregon State University Extension publications listed in Section 5.

The formulas for determining the total nutrient application rate per unit yield for each crop shown in the table below are as follows:

Total N to apply in pounds = N in pounds per yield unit from the table for the crop grown X percent (%) dry matter (DM) of harvested crop/100 X planned or measured yield per yield unit

Total P_2O_5 to apply in pounds = P in pounds per yield unit from the table for the crop grown X 2.291 P_2O_5/P X percent (%) dry matter (DM) of harvested crop/100 X planned or measured yield per yield unit

Total K_2O to apply in pounds = K in pounds per yield unit from the table for the crop grown X 1.205 K_2O/K X percent (%) dry matter (DM) of harvested crop/100 X planned or measured yield per yield unit

The following tables show the crops that may be grown on this farm:

				Nutrient Removal (lb/yield unit)		
FRUIT OR VEGETABLES	**Yield Unit**	**lb/Unit**	**% DM**	**N**	**P**	**K**
Beans, dry edible	cwt	100	100	3.13	0.45	0.85
Blueberries	ton	2000	100	2.14	0.20	3.54
Caneberries	ton	2000	100	11.43	7.42	11.43
Corn, Sweet	ton	2000	100	17.80	4.8	11.6
Mixed Vegetables & Fruit	ton	2000	100	8.33	2.08	10.20
Onions	cwt	100	100	0.18	0.04	0.13
Orchard, Fruit	ton	2000	100	13.00	2.00	16.00
Pea, edible	ton	2000	100	73.60	8.00	18.00
Potatoes	ton	2000	100	6.60	1.20	10.33
Squash	ton	2000	100	3.2	1.02	1.71

MANURE UTILIZATION

GRAIN, SEED OR OIL CROPS	Yield Unit	lb/Unit	% DM	Nutrient Removal (lb/yield unit)		
				N	P	K
Barley	bushels	48	100	0.87	0.16	0.21
Beets, sugar	ton	2000	100	4.00	0.60	2.78
Bluegrass, Seed	cwt	100	100	2.88	0.43	1.98
Canola	ton	2000	100	70.00	12.00	18.00
Corn, grain shelled	bushels	56	100	0.90	0.16	0.22
Crimson Clover seed	lb	1	100	0.05	0.01	0.02
Fescue Seed, Straw Removed	cwt	100	100	10.03	1.08	8.33
Fescue, seed (Fine or Tall)	lb	1	100	0.02	0.00	0.00
Oats, grain	bushels	32	100	0.62	0.11	0.16
Orchardgrass seed	lb	1	100	0.016	0.002	0.004
Peppermint for Oil	ton	2000	100	4.20	1.80	2.80
Peppermint for Oil, Leaves and Stems Removed	ton	2000	100	87.2	36.8	57.8
Pumpkins	ton	2000	100	4.00	1.40	6.60
Rapeseed	bushels	50	100	1.38	0.30	0.30
Red Clover seed	cwt	100	100	4.55	1.00	2.00
Ryegrass Seed	cwt	100	100	7.5	0.94	1.88
Ryegrass Seed, Straw Removed	Ton	2000	100	30.0	18.8	37.6
Ryegrass, Perennial Seed	lb	1	100	0.02	0.002	0.004
Triticale, Haylage	ton	2000	100	14.7	2.04	3.42
Wheat, Soft White for grain	bushels	60	100	1.00	0.24	0.21
Wheat, Soft White Straw Removed	ton	2000	100	43.40	8.90	20.90
Wheat, Hard Red for grain	bushels	60	100	1.60	0.37	0.31
Wheat, Hard Red Straw Removed	ton	2000	100	53.36	10.96	23.76

MANURE UTILIZATION

HAY AND PASTURE CROPS	Yield Unit	lb/Unit	% DM	Nutrient Removal (lb/yield unit)		
				N	P	K
Alfalfa, Hay	ton	2000	100	54.4	6.8	35.7
Alfalfa, Seed	cwt	100	100	6.12	0.70	2.34
Alta Fescue Hay/Pasture	ton	2000	100	32.98	6.88	37.60
Grass Legume Hay/Pasture	ton	2000	100	33.92	5.30	7.56
Meadow Fescue Hay/Pasture	ton	2000	100	41.56	8.70	47.43
Oats Hay/Pasture	ton	2000	100	26.01	10.20	14.79
Orchardgrass Hay/Pasture	ton	2000	100	53.21	8.58	18.62
Perennial Grass Hay/Pasture	ton	2000	100	58.00	8.00	40.00
Reed Canary Grass	ton	2000	100	27.03	3.57	41.57
Ryegrass Hay	ton	2000	100	33.41	5.44	28.39
Ryegrass, Perennial Pasture	ton	2000	100	58.00	8.00	48.00
Tall Fescue Hay/Pasture	ton	2000	100	39.40	4.00	40.00

SILAGE AND HAYLAGE CROPS	Yield Unit	lb/Unit	% DM	Nutrient Removal (lb/yield unit)		
				N	P	K
Alfalfa/Grass Haylage	ton	2000	100	15.60	1.02	6.84
Corn for Silage	ton	2000	100	7.50	1.20	6.00
Crimson Clover forage	ton	2000	100	40.00	4.41	32.98
Field Pea, Forage	ton	2000	100	73.60	8.00	18.00
Oat haylage	ton	2000	100	12.8	2.24	7.44
Oats & Peas/ Green Beans	ton	2000	100	32.03	5.58	18.65
Perennial Grass Haylage	ton	2000	100	15.00	2.40	12.78
Red Clover forage	ton	2000	100	40.00	4.41	32.98
Ryegrass Haylage	ton	2000	100	15.00	2.40	12.78
Sorghum-Sudan Haylage	ton	2000	100	16.32	1.92	17.4
Triticale Haylage	ton	2000	100	14.70	2.04	3.42
Wheatgrass Hay/Pasture	ton	2000	100	49.59	6.21	68.76

MANURE UTILIZATION

OTHER CROPS	Yield Unit	lb/Unit	% DM	Nutrient Removal (lb/yield unit) N	P	K
Filberts	ton	2000	100	41.7	7.30	39.29
Hops, Cones	bale	200	100	9.00	0.96	5.00
Natural Area (Trees and Grass)	ton	2000	100	10.52	1.56	9.20
Nursery Stock	ton	2000	100	8.33	2.08	10.20
Poplars, Pulpwood	ton	2000	100	0.30	0.09	0.12

MANURE UTILIZATION

Aguiar Dairy

SOLID MANURE APPLICATION CHART

MANURE ANALYSIS (As received lb/ton)

Total N	NH4-N	P_2O_5	K_2O
8.12	2.14	5.50	20.12

Test Date: 05/04/15
Source: Solids Pile

Manure Nutrient Content

Thickness to apply (in)	Manure Applied (T/A)	Total N (lb/A)	Available N (lb/A)	P_2O_5 (lb/A)	K_2O (lb/A)
0.013	1.00	8	2	5	20
0.026	2.00	16	4	11	40
0.039	3.00	24	6	16	60
0.052	4.00	32	9	22	80
0.066	5.00	41	11	27	101
0.079	6.00	49	13	33	121
0.092	7.00	57	15	38	141
0.105	8.00	65	17	44	161
0.118	9.00	73	19	49	181
0.131	10.00	81	21	55	201
CUSTOM:					
Spreader 1	12.1	99	26	67	244
Spreader 2	18.2	148	39	100	366
Spreader 3	36.4	296	78	200	733

SOLID MANURE SPREADER 1 CALIBRATION

SPREADER VOLUME AND WEIGHT CALCULATIONS

Stack height above sideboard = 1 ft
Length = 15.3 ft
Depth = 2 ft
Width = 5.4 ft

Spreader Volume = 231 ft3
Weight of Manure = 12,543 lbs

MANURE DENSITY CALCULATIONS

BUCKET
Top Diam 11 ght 13.75 Volume 0.756 ft3
Weight 41 lbs
Manure Density = 54 lbs/ft3

SPREAD AREA CALCULATIONS

Spread Width = 15 ft
Application Area
Spread Length = 1,500 ft

Area Spread = 22,500 ft2 or 0.52 acre

Manure Rate Spread = 0.56 lbs/ft2
24,283 lbs/acre
12.1 ton/acre

SOLID MANURE SPREADER 2 CALIBRATION

SPREADER VOLUME AND WEIGHT CALCULATIONS

Stack height above sideboard = 1 ft
Length = 15.3 ft
Depth = 2 ft
Width = 5.4 ft

Spreader Volume = 231 ft3
Weight of Manure = 12,543 lbs

MANURE DENSITY CALCULATIONS

BUCKET
Top Diam 11 Height 13.75 Volume 0.756 ft3
Weight 41 lbs
Manure Density = 54 lbs/ft3

SPREAD AREA CALCULATIONS

Spread Width = 15 ft
Application Area
Spread Length = 1,000 ft

Area Spread = 15,000 ft2 or 0.34 acre

Manure Rate Spread = 0.84 lbs/ft2
36,424 lbs/acre
18.2 ton/acre

SOLID MANURE SPREADER 3 CALIBRATION

SPREADER VOLUME AND WEIGHT CALCULATIONS

Stack height above sideboard = 1 ft
Length = 15.3 ft
Depth = 2 ft
Width = 5.4 ft

Spreader Volume = 231 ft3
Weight of Manure = 12,543 lbs

MANURE DENSITY CALCULATIONS

BUCKET
Top Diam 11 Height 13.75 Volume 0.756 ft3
Weight 41 lbs
Manure Density = 54 lbs/ft3

SPREAD AREA CALCULATIONS

Spread Width = 15 ft
Application Area
Spread Length = 500 ft

Area Spread = 7,500 ft2 or 0.17 acre

Manure Rate Spread = 1.67 lbs/ft2
72,848 lbs/acre
36.4 ton/acre

MANURE UTILIZATION

Aguiar Dairy

LIQUID MANURE APPLICATION CHART

MANURE ANALYSIS
(As received lb/1000 gal)

		Total N	NH4-N	P_2O_5	K_2O
Test Date:	05/04/15	20.41	11.08	9.79	26.79
Source:	Tank				

Manure Nutrient Content

Thickness to apply (inch)	Manure Applied (gallons)	Total N (lb/A)	Available N (lb/A)	P_2O_5 (lb/A)	K_2O (lb/A)
0.25	6,789	139	75	66	182
0.50	13,577	277	150	133	364
0.75	20,366	416	226	199	546
1.00	27,154	554	301	266	728
1.25	33,943	693	376	332	909
1.50	40,731	831	451	399	1091
1.75	47,520	970	526	465	1273
2.00	54,308	1108	602	532	1455
CUSTOM:					
Tank Wagon	3,630	74	40	36	97
Big Gun	12,144	248	135	119	325
Spreader Bar	20,364	416	226	199	546

EQUIPMENT CALIBRATION CALCULATIONS

TANK WAGON MANURE SPREADER CALIBRATION

Volume of Wagon = 3,000 gallons OR 401 ft3

Spread Length = 600 ft

Spread Width = 60 ft

Area Spread = 36,000 ft2 OR 0.83 acre

NOTE: Area spread is the total area covered by the tank wagon application.

APPLICATION RATE = 3,630 gal/acre OR 0.13 in/acre

NOTE: Inch/acre should be close to amount collected in a rain gauge or pan

BIG GUN TRAVELOR APPLICATION RATE CALCULATIONS

Nozzle Diameter 1.00 inch — Wetted Dia 330 feet

Pump Pressure 80 psi — Flow Rate 230 gpm

Hose Speed = 24 sec/foot

= 2.5 feet/minute

= 150 feet/hour

Spread Width = 330 ft

Length of Pull = 1,200 ft

Area Spread = 396,000 ft2 OR 9.09 acre

NOTE: Area spread is the total area covered by the big gun application.

APPLICATION RATE = 12,144 gal/acre OR = 0.45 inch/acre

NOTE: Inch/acre should be close to amount collected in a rain gauge or pan

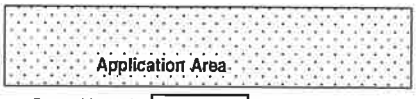
SPREADER BAR APPLICATION RATE CALCULATIONS

Spreader Bar Width- 12 ft

Flowrate- 279 gpm

Time to Apply- 5 Hrs

Spread Width = 120 ft



Spread Length= 1,492 ft

Area Spread = 179,040 ft2 OR 4.11 acre

NOTE: Area spread is the total area covered by the spreader bar application.

APPLICATION RATE = 20,364 gal/acre OR = 0.75 inch/acre

NOTE: Inch/acre should be close to amount collected in a rain gauge or pan

MANURE UTILIZATION

IRRIGATION WATER MANAGEMENT

The application of Irrigation Water Management to the irrigated fields as shown on the Field Map will manage soil moisture to promote the desired crop response, optimize the available water supplies, minimize irrigation induced erosion, decrease non-point source pollution of surface and groundwater sources, manage salts in the crop root zone and manage the crop micro climate. Irrigation water is supplied by wells and surface water sources using pumps through pipelines to sprinkler irrigation systems. The average amount of irrigation water to be applied per application and total annual amount needed for irrigated crops with guidance on when and how much irrigation water to apply can be found starting on page 3-30.

Permits: Under Oregon law all water is publicly owned and anyone planning to store or divert surface or groundwater for the purpose of irrigation must obtain a permit or water right from the Oregon Water Resources Department. These permits or water rights must be obtained prior to the use of the water. It is the responsibility of the Farmer to file for the necessary permits or water rights.

Permits or water rights are not needed to apply wastewater as a nutrient source.

Irrigation Water Flows, Volumes, and Relationships

Equation 1-

$$Q \times T = D \times A$$

where:

Q = flow rate (acre-in/hr or cfs)
T = time (hr)
D = gross depth applied (in)
A = area (acres)

Equation 2-

$$Q = \frac{453 \times A \times D}{F \times H}$$

where:

Q = flow rate (gpm)
A = area (acres)
D = gross application depth (in)
F = irrigation period (days)
H = hours of operation per day

Water Flow Rates:

1 cubic foot per second (cfs)
= 448.8 gallons per minute
1 cfs for 1 hour = 0.99 acre-inch
1 cfs for 24 hr = 1.98 acre-ft
1,000 gpm = 2.23 cfs
1,000 gpm for 24 hr = 4.42 ac-ft
1 gpm/acre = 0.053 ac-in/ac/day
1 cfs = 40 miner's inches in OR, No CA
1 cfs = 50 miner's inches in ID, WA
1 miner's inch = 11.22 gpm in OR
1 miner's inch = 9 gpm in ID, WA
1 cfs = 28.32 liters/sec
1 cubic meter/sec = 35.3 cfs
1 liter/sec = 15.85 gpm

Q x T = D x A *where:*

Q = cfs, T = hr; D = inches depth; A = acres

Gpm for 5 ft/s velocity in PVC pipe:

6"	8"	10"	12"	14"
480	800	1250	1750	2150

NRCS Natural Resources Conservation Service

Water Volumes & Weights:

1 cubic foot = 7.48 gallons
= 62.4 lb = 28.3 liters
1 acre-foot = 43,560 cubic feet
(1 acre covered 1 ft deep)
12 acre-in = 1 acre-ft = 325,829 gal
1 million gallons = 3.07 acre-ft
1 acre-ft = 1,234 cubic meters
1 cu meter = 1,000 liters = 35.3 cu ft

Pressure and Pressure Head:

1 psi = 2.31 ft of pressure head
1 atmosphere (sea level)
= 14.7 psi = 33.9 ft of head

Lengths and Areas:

1 mile = 5,280 ft = 1.61 km
1 meter = 3.28 ft = 39.37 inches
1 acre = 43,560 square ft
1 hectare = 2.47 acres

Pump Power Requirement

$$Horsepower = \frac{Pump\ Head\ in\ ft \times gpm}{39.6 \times \%\ Pump\ Efficiency}$$

MANURE UTILIZATION

SOILS-

Based on the Natural Resources Conservation Service National Engineering Handbook, Part 652, National Irrigation Guide, the irrigated soils on this farm have an average water holding capacity of 0.20 inches per inch of soil depth and a soil intake rate of 0.40 inches per hour.

CROPS-

CROP	MATURE ROOT DEPTH (INCHES)	MAXIMUM ALLOWED DEPLETION	CRITICAL PERIOD
Grass Hay/Pasture	30	50%	July

Above data are from EM8713, *Western Oregon Irrigation Guides*, June 1998, OSU: Corvallis, OR and NRCS *Irrigation Guide (National Engineering Handbook, Part 652)*.

IRRIGATION WATER SUPPLY-

Description of Oregon Water Right:	Certificates 21797, 38927, 38832
Description of Irrigation Water Supply (Well, Stream, Irrigation District, etc.):	Well and Miami River
Supply Flowrate (gpm or cfs):	743 gpm or 1.66 cfs
Annual Volume Available (Acre-ft.):	331 AF
Water Delivery Schedule:	On Demand
Method(s) of Water Measurement:	NA

IRRIGATION SYSTEM-

System	System Capacity (gpm)	Nozzle Size (in)	Pressure (psi)	Spacing (ft)	Application Rate (in/hr)	System Efficiency (%)
Traveling Big Gun Sprinkler	240	1.0	80 to 90	180 to 240	0.4 to 0.5	65

MANURE UTILIZATION

Irrigation Water Management Worksheet						
Crop Name:	**Hay/Pasture Land**					
Managed Rooting Depth (inches):	**30**					
Management Allowed Depletion, MAD:	**50%**					
Irrigated Acres:	**149**					
Soil Name:	**Brenner, Nehalem, Nestucca-Brenner, Logsden**					
Soil Depth (inches):	**60**					
Available Water Capacity (in/in):	**0.20**					
Soil Intake Rate (in/hr) :	**0.40**					
IRRIGATION REQUIREMENT HOW MUCH water to apply?	**Month**					
	April	**May**	**June**	**July**	**August**	**Sept**
Total Plant Available Water Capacity (in): Soil or Root Depth * Available Water Capacity	6.0	6.0	6.0	6.0	6.0	6.0
Net Irrigation Application (in): Total Plant Available Water Capacity * MAD	3.0	3.0	3.0	3.0	3.0	3.0
Irrigation System Application Rate (in/hr): Determined based on the type of Irrigation System	0.38	0.38	0.38	0.38	0.38	0.38
IRRIGATION TIMING WHEN to apply water?						
Net Irrigation Water Requirement (in): (From OSU Extension Miscellaneous Pub 8530, 1992)	**2.64**	**3.74**	**3.66**	**3.98**	**3.39**	**2.87**
Average Daily Crop Water Use (in/day):	0.09	0.12	0.12	0.13	0.11	0.10
Irrigation Frequency (days): Net Irrigation Application / Daily Crop Water Use	30	25	25	23	27	30
Irrigation System Set Time (hours):	**7.5**	**7.5**	**7.5**	**7.5**	**7.5**	**7.5**
Actual Net Irrigation Application (in): Gross Application * System Application Efficiency	**1.85**	**1.85**	**1.85**	**1.85**	**1.85**	**1.85**
Actual Irrigation Frequency (days): Actual Net Irrigation Application / Daily Crop Water Use	**21**	**15**	**15**	**14**	**17**	**19**
IRRIGATION SYSTEM CAPACITY						
System Application Efficiency (%): Water Required / Water Applied	**65%**	**65%**	**65%**	**65%**	**65%**	**65%**
Gross Irrigation Application (in): System Application Rate * System Set Time	2.85	2.85	2.85	2.85	2.85	2.85
Volume of Water per Irrigation (acre-in): Gross Irrigation Application * Irrigated Acres	425	425	425	425	425	425
Irrigation System Operation (hours/day):	16	16	16	16	16	16
Required System Flow Rate (gpm): (Equation 2)	**571**	**783**	**792**	**833**	**710**	**621**
Compare **Required** system flow rate with **Measured** flow noted on **Irrigation Application Record**						

SOIL AND RISK ASSESSMENT

SOIL MAP(S)

Soil Map—Tillamook County, Oregon
(Aguiar Dairy)

Map Scale: 1:14,000 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 200, 400, 800, 1200

Feet: 0, 500, 1000, 2000, 3000

N

Map projection: Web Mercator Corner coordinates: WGS84

USDA Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

4/19/2017
Page 1 of 3

SOIL AND RISK ASSESSMENT

Soil Map—Tillamook County, Oregon
(Aguiar Dairy)

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Tillamook County, Oregon
Survey Area Data: Version 8, Sep 13, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 9, 2011—Sep 4, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Tillamook County, Oregon (OR057)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
1A	Brenner silt loam, 0 to 1 percent slopes	46.3	18.6%
3A	Coquille silt loam, 0 to 1 percent slopes	0.2	0.1%
20D	Klootchie-Necanicum complex, 5 to 30 percent slopes	18.6	7.5%
20E	Klootchie-Necanicum complex, 30 to 60 percent slopes	17.4	7.0%
21F	Necanicum-Ascar-Klootchie complex, 60 to 90 percent slopes	0.8	0.3%
56B	Wolfer medial silt loam, 0 to 5 percent slopes	5.6	2.3%
57B	Condorbridge gravelly medial loam, 0 to 7 percent slopes	5.7	2.3%
57C	Condorbridge gravelly medial loam, 3 to 15 percent slopes	4.1	1.7%
74A	Nehalem silt loam, 0 to 3 percent slopes	92.1	37.0%
77A	Nestucca-Brenner silt loams, 0 to 3 percent slopes	8.8	3.5%
92A	Yachats-Gauldy complex, 0 to 3 percent slopes	16.5	6.6%
93B	Gauldy complex, 0 to 5 percent slopes	20.8	8.4%
170A	Logsden silt loam, 0 to 3 percent slopes	11.9	4.8%
Totals for Area of Interest		**249.0**	**100.0%**

SOIL AND RISK ASSESSMENT

SOIL REPORTS

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Tillamook County, Oregon

1A—Brenner silt loam, 0 to 1 percent slopes

Map Unit Setting
National map unit symbol: 27z0
Elevation: 10 to 200 feet

Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 300 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Brenner and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brenner

Setting
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile
Ap - 0 to 7 inches: silt loam
A - 7 to 12 inches: silty clay loam
Bw1 - 12 to 18 inches: silty clay loam
Bw2 - 18 to 26 inches: silty clay loam
BC - 26 to 40 inches: silty clay loam
Cg1 - 40 to 55 inches: silty clay
Cg2 - 55 to 60 inches: silty clay

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 0 to 7 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Available water storage in profile: High (about 11.6 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Other vegetative classification: Poorly Drained (G004AY018OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: Yes

3A—Coquille silt loam, 0 to 1 percent slopes

Map Unit Setting
National map unit symbol: 27z2
Elevation: 10 to 20 feet

Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 180 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition
Coquille and similar soils: 85 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Coquille

Setting
Landform: Tidal marshes, estuaries
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Estuarine deposits

Typical profile
A - 0 to 6 inches: silt loam
C1 - 6 to 14 inches: silt loam
C2 - 14 to 34 inches: silty clay loam
2Cg1 - 34 to 49 inches: silty clay loam
2Cg2 - 49 to 60 inches: silty clay loam

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Very frequent
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: High (about 11.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Other vegetative classification: Very Poorly Drained (G004AY019OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: Yes

Minor Components

Brenner
Percent of map unit: 5 percent
Landform: Flood plains
Other vegetative classification: Poorly Drained (G004AY018OR)

Hydric soil rating: Yes

Histosols

Percent of map unit: 5 percent
Landform: Tidal marshes
Hydric soil rating: Yes

20D—Klootchie-Necanicum complex, 5 to 30 percent slopes

Map Unit Setting

National map unit symbol: 27xq
Elevation: 50 to 1,800 feet
Mean annual precipitation: 80 to 110 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 120 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Klootchie and similar soils: 60 percent
Necanicum and similar soils: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Klootchie

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Summit, toeslope
Landform position (three-dimensional): Mountaintop, mountainbase
Down-slope shape: Concave
Across-slope shape: Concave, linear
Parent material: Colluvium and residuum derived from igneous rock and tuff

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 9 inches: medial silt loam
A2 - 9 to 19 inches: medial silt loam
Bw1 - 19 to 44 inches: medial silty clay loam
Bw2 - 44 to 68 inches: medial silty clay loam

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 19.1 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Other vegetative classification: Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Description of Necanicum

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Mountaintop, mountainbase
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Colluvium derived from igneous rock and tuff

Typical profile
Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 10 inches: very gravelly medial loam
A2 - 10 to 18 inches: very gravelly medial loam
Bw1 - 18 to 27 inches: very gravelly medial loam
Bw2 - 27 to 49 inches: extremely cobbly medial loam
Bw3 - 49 to 71 inches: extremely cobbly medial loam

Properties and qualities
Slope: 5 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Other vegetative classification: Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

20E—Klootchie-Necanicum complex, 30 to 60 percent slopes

Map Unit Setting
National map unit symbol: 27x3
Elevation: 50 to 1,800 feet
Mean annual precipitation: 80 to 110 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 120 to 210 days

Farmland classification: Not prime farmland

Map Unit Composition

Klootchie and similar soils: 55 percent
Necanicum and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Klootchie

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Center third of mountainflank, lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Concave, linear
Parent material: Colluvium and residuum derived from igneous rock and tuff

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 9 inches: medial silt loam
A2 - 9 to 19 inches: medial silt loam
Bw1 - 19 to 44 inches: medial silty clay loam
Bw2 - 44 to 68 inches: medial silty clay loam

Properties and qualities

Slope: 30 to 60 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 19.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Other vegetative classification: Sitka spruce/oxalis, swordfern-moist (902)
Hydric soil rating: No

Description of Necanicum

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Upper third of mountainflank, lower third of mountainflank
Down-slope shape: Linear, convex

Across-slope shape: Convex, linear
Parent material: Colluvium derived from igneous rock and tuff

Typical profile
Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 10 inches: very gravelly medial loam
A2 - 10 to 18 inches: very gravelly medial loam
Bw1 - 18 to 27 inches: very gravelly medial loam
Bw2 - 27 to 49 inches: extremely cobbly medial loam
Bw3 - 49 to 71 inches: extremely cobbly medial loam

Properties and qualities
Slope: 30 to 60 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Other vegetative classification: Sitka spruce/oxalis, swordfern-moist (902)
Hydric soil rating: No

21F—Necanicum-Ascar-Klootchie complex, 60 to 90 percent slopes

Map Unit Setting
National map unit symbol: 27xv
Elevation: 50 to 1,800 feet
Mean annual precipitation: 80 to 110 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 120 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition
Necanicum and similar soils: 40 percent
Ascar and similar soils: 25 percent
Klootchie and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Necanicum

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Center third of mountainflank, lower third of mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium derived from igneous rock

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 10 inches: very gravelly medial loam
A2 - 10 to 18 inches: very gravelly medial loam
Bw1 - 18 to 27 inches: very gravelly medial loam
Bw2 - 27 to 49 inches: extremely cobbly medial loam
Bw3 - 49 to 71 inches: extremely cobbly medial loam

Properties and qualities

Slope: 60 to 90 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Other vegetative classification: Sitka spruce/oxalis, swordfern-moist (902)
Hydric soil rating: No

Description of Ascar

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Concave, linear
Across-slope shape: Convex, linear
Parent material: Colluvium derived from igneous rock

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 9 inches: extremely gravelly medial loam
A2 - 9 to 25 inches: extremely cobbly medial loam
Bw - 25 to 39 inches: extremely cobbly medial loam
R - 39 to 43 inches: unweathered bedrock

Properties and qualities

Slope: 60 to 90 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Other vegetative classification: Sitka spruce/oxalis, swordfern-moist (902)
Hydric soil rating: No

Description of Klootchie

Setting
Landform: Mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Colluvium and residuum derived from igneous rock

Typical profile
Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 9 inches: medial silt loam
A2 - 9 to 19 inches: medial silt loam
Bw1 - 19 to 44 inches: medial silty clay loam
Bw2 - 44 to 68 inches: medial silty clay loam

Properties and qualities
Slope: 60 to 90 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 19.1 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Other vegetative classification: Sitka spruce/oxalis, swordfern-moist (902)
Hydric soil rating: No

56B—Wolfer medial silt loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 12fql
Elevation: 20 to 250 feet
Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Wolfer and similar soils: 80 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wolfer

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium overlying sandy and gravelly alluvium derived from igneous rock

Typical profile

Ap - 0 to 8 inches: medial silt loam
A - 8 to 14 inches: medial silt loam
AB - 14 to 22 inches: medial silt loam
Bw - 22 to 35 inches: medial silty clay loam
2C - 35 to 60 inches: extremely gravelly loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: 24 to 36 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 12.3 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Other vegetative classification: Well Drained <15% Slopes (G004AY014OR), Sitka spruce/oxalis, swordfern-moist (902)
Hydric soil rating: No

Minor Components

Hebo

Percent of map unit: 5 percent
Landform: Depressions on stream terraces
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

57B—Condorbridge gravelly medial loam, 0 to 7 percent slopes

Map Unit Setting

National map unit symbol: 12fqm
Elevation: 20 to 200 feet
Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Condorbridge and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Condorbridge

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear, concave
Across-slope shape: Linear
Parent material: Alluvium and/or debris flow deposits derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 5 inches: gravelly medial loam
A - 5 to 12 inches: gravelly medial loam
BA - 12 to 26 inches: gravelly loam
Bw1 - 26 to 35 inches: paragravelly clay loam
Bw2 - 35 to 53 inches: paragravelly clay loam
Bw3 - 53 to 60 inches: paragravelly clay loam

Properties and qualities

Slope: 0 to 7 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water storage in profile: Very high (about 13.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Other vegetative classification: Well Drained <15% Slopes (G004AY014OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Minor Components

Hebo

Percent of map unit: 5 percent
Landform: Depressions on stream terraces
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

57C—Condorbridge gravelly medial loam, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: sws2
Elevation: 20 to 800 feet
Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Condorbridge and similar soils: 80 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Condorbridge

Setting

Landform: Alluvial fans
Landform position (three-dimensional): Riser
Down-slope shape: Concave, linear
Across-slope shape: Linear
Parent material: Alluvium and/or debris flow deposits derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 5 inches: gravelly medial loam
A - 5 to 12 inches: gravelly medial loam
BA - 12 to 26 inches: gravelly loam
Bw1 - 26 to 35 inches: paragravelly clay loam
Bw2 - 35 to 53 inches: paragravelly clay loam
Bw3 - 53 to 60 inches: paragravelly clay loam

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 13.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Well Drained <15% Slopes (G004AY014OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Minor Components

Aquepts

Percent of map unit: 5 percent
Landform: Depressions on alluvial fans
Hydric soil rating: Yes

74A—Nehalem silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 27z5
Elevation: 10 to 200 feet
Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Nehalem, occasional flooding, and similar soils: 80 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nehalem, Occasional Flooding

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 9 inches: silt loam
A - 9 to 16 inches: silt loam
Bw - 16 to 48 inches: silt loam
BC - 48 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Other vegetative classification: Well Drained <15% Slopes (G004AY014OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Minor Components

Brenner

Percent of map unit: 3 percent
Landform: Depressions on flood plains
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

77A—Nestucca-Brenner silt loams, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 27wj
Elevation: 10 to 200 feet
Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Nestucca and similar soils: 55 percent
Brenner and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nestucca

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 6 inches: silt loam
A - 6 to 14 inches: silt loam
Bw - 14 to 41 inches: silty clay loam
C - 41 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 14 to 41 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Other vegetative classification: Somewhat Poorly Drained (G004AY017OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Description of Brenner

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 7 inches: silt loam
A - 7 to 12 inches: silty clay loam
Bw1 - 12 to 18 inches: silty clay loam
Bw2 - 18 to 26 inches: silty clay loam
BC - 26 to 40 inches: silty clay loam
Cg1 - 40 to 55 inches: silty clay
Cg2 - 55 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 0 to 7 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Other vegetative classification: Poorly Drained (G004AY018OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: Yes

92A—Yachats-Gauldy complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: sws6
Elevation: 10 to 400 feet
Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Yachats and similar soils: 45 percent
Gauldy and similar soils: 40 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Yachats

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 9 inches: very fine sandy loam
A - 9 to 19 inches: loam
C1 - 19 to 39 inches: fine sandy loam
C2 - 39 to 54 inches: fine sandy loam
C3 - 54 to 60 inches: very fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B
Other vegetative classification: Well Drained <15% Slopes (G004AY014OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Description of Gauldy

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 10 inches: loam
Bw - 10 to 26 inches: gravelly loam
2C1 - 26 to 38 inches: extremely gravelly loamy coarse sand
2C2 - 38 to 55 inches: loamy fine sand
2C3 - 55 to 60 inches: extremely gravelly fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 30 inches to strongly contrasting textural stratification
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A

Other vegetative classification: Somewhat Excessively Drained (G004AY012OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Minor Components

Brenner

Percent of map unit: 5 percent
Landform: Depressions on flood plains
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

93B—Gauldy complex, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1jxw4
Elevation: 10 to 400 feet
Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Gauldy, occasional flooding, and similar soils: 50 percent
Gauldy, rare flooding, and similar soils: 35 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gauldy, Occasional Flooding

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile

Ap - 0 to 10 inches: loam
Bw - 10 to 26 inches: gravelly loam
2C1 - 26 to 38 inches: extremely gravelly loamy coarse sand
2C2 - 38 to 55 inches: loamy fine sand
2C3 - 55 to 60 inches: extremely gravelly fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 30 inches to strongly contrasting textural stratification
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A
Other vegetative classification: Somewhat Excessively Drained (G004AY012OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Description of Gauldy, Rare Flooding

Setting
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile
Ap - 0 to 10 inches: loam
Bw - 10 to 26 inches: gravelly loam
2C1 - 26 to 38 inches: extremely gravelly loamy coarse sand
2C2 - 38 to 55 inches: loamy fine sand
2C3 - 55 to 60 inches: extremely gravelly fine sand

Properties and qualities
Slope: 0 to 5 percent
Depth to restrictive feature: 20 to 30 inches to strongly contrasting textural stratification
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water storage in profile: Low (about 3.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Other vegetative classification: Somewhat Excessively Drained (G004AY012OR), Sitka spruce/salmonberry-wet (903)
Hydric soil rating: No

Minor Components

Brenner
Percent of map unit: 10 percent

Landform: Stream terraces
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

170A—Logsden silt loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 27zd
Elevation: 20 to 200 feet
Mean annual precipitation: 80 to 100 inches
Mean annual air temperature: 49 to 52 degrees F
Frost-free period: 160 to 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Logsden and similar soils: 85 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Logsden

Setting
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear, concave
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock

Typical profile
Ap - 0 to 8 inches: silt loam
A - 8 to 17 inches: silt loam
Bw1 - 17 to 37 inches: silty clay loam
Bw2 - 37 to 60 inches: silty clay loam

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water storage in profile: High (about 12.0 inches)

Interpretive groups
Land capability classification (irrigated): 2c
Land capability classification (nonirrigated): 2c
Hydrologic Soil Group: B
Other vegetative classification: Well Drained <15% Slopes (G004AY014OR), Sitka spruce/salmonberry-wet (903)

Hydric soil rating: No

Minor Components

Brenner

Percent of map unit: 2 percent
Landform: Depressions on flood plains
Other vegetative classification: Poorly Drained (G004AY018OR)
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Tillamook County, Oregon
Survey Area Data: Version 8, Sep 16, 2016

SOIL AND RISK ASSESSMENT

SOIL AND RISK ASSESSMENT

PREDICTED SOIL EROSION

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	Tract #	Field name
Aguiar Dairy	103	1

Location	Soil	T value, t/ac/yr	Slope length (horiz), ft	Avg. slope steepness, %
Oregon\Tillamook County\OR_Tillamook_R80-90	92A Yachats-Gauldy complex, 0 to 3 percent slopes\Yachats very fine sandy loam 45%	5.0	900	3.0

Alternatives:

Description	Management	Contouring	Strips / barriers	Diversion/terrace, sediment basin	Cons. plan. soil loss	Soil conditioning index (SCI)	STIR value	Wind & irrigation-induced erosion for SCI, t/ac/yr	Equiv. diesel use, gal/ac	Energy use, BTU/ac	Fuel cost, US$/ac
Erosion on Grass Pasture	a.Single Year/Single Crop Templates\A_Pasture; fall planted, 5 yrs rotational grazing, manure application, CMZ 71	a. rows up-and-down hill	(none)	(none)	1.6	0.64	37.5	0	18	2500000	53.0

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	*Tract #*	*Field name*
Aguiar Dairy	**103**	**2, 3**

Location	*Soil*	*T value, t/ac/yr*	*Slope length (horiz), ft*	*Avg. slope steepness, %*
Oregon\Tillamook County\OR_Tillamook_R80-90	77A Nestucca-Brenner silt loams, 0 to 3 percent slopes\Nestucca silt loam 55%	5.0	900	3.0

Alternatives:

Description	*Management*	*Contouring*	*Strips / barriers*	*Diversion/terrace, sediment basin*	*Cons. plan. soil loss*	*Soil conditioning index (SCI)*	*STIR value*	*Wind & irrigation-induced erosion for SCI, t/ac/yr*	*Equiv. diesel use, gal/ac*	*Energy use, BTU/ac*	*Fuel cost, US$/ac*
Erosion on Grass Pasture	a.Single Year/Single Crop Templates\A_Pasture; fall planted, 5 yrs rotational grazing, manure application, CMZ 71	a. rows up-and-down hill	(none)	(none)	1.5	0.64	37.5	0	20	2700000	58.9

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	*Tract #*	*Field name*
Aguiar Dairy	**103**	**4, 5**

Location	*Soil*	*T value, t/ac/yr*	*Slope length (horiz), ft*	*Avg. slope steepness, %*
Oregon\Tillamook County\OR_Tillamook_R80-90	170A Logsden silt loam, 0 to 3 percent slopes\Logsden silt loam 85%	5.0	900	3.0

Alternatives:

Description	*Management*	*Contouring*	*Strips / barriers*	*Diversion/terrace, sediment basin*	*Cons. plan. soil loss*	*Soil conditioning index (SCI)*	*STIR value*	*Wind & irrigation-induced erosion for SCI, t/ac/yr*	*Equiv. diesel use, gal/ac*	*Energy use, BTU/ac*	*Fuel cost, US$/ac*
Erosion on Grass Pasture	a.Single Year/Single Crop Templates\A_Pasture; fall planted, 5 yrs rotational grazing, manure application, CMZ 71	a. rows up-and-down hill	(none)	(none)	1.9	0.61	37.5	0	20	2700000	58.9

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	Tract #	Field name
Aguiar Dairy	78, 103, 221	6, 7, McD1, McD3, Rental

Location	Soil	T value, t/ac/yr	Slope length (horiz), ft	Avg. slope steepness, %
Oregon\Tillamook County\OR_Tillamook_R80-90	74A Nehalem silt loam, 0 to 3 percent slopes\Nehalem silt loam 80%	5.0	900	3.0

Alternatives:

Description	Management	Contouring	Strips / barriers	Diversion/terrace, sediment basin	Cons. plan. soil loss	Soil conditioning index (SCI)	STIR value	Wind & irrigation-induced erosion for SCI, t/ac/yr	Equiv. diesel use, gal/ac	Energy use, BTU/ac	Fuel cost, US$/ac
Erosion on Grass Pasture	a.Single Year/Single Crop Templates\A_Pasture; fall planted, 5 yrs rotational grazing, manure application, CMZ 71	a. rows up-and-down hill	(none)	(none)	2.0	0.61	37.5	0	20	2700000	58.9

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	*Tract #*	*Field name*
Aguiar Dairy	**103**	**Darren**

Location	*Soil*	*T value, t/ac/yr*	*Slope length (horiz), ft*	*Avg. slope steepness, %*
Oregon\Tillamook County\OR_Tillamook_R80-90	93B Gauldy complex, 0 to 5 percent slopes\Gauldy loam 50%	3.0	900	3.0

Alternatives:

Description	*Management*	*Contouring*	*Strips / barriers*	*Diversion/terrace, sediment basin*	*Cons. plan. soil loss*	*Soil conditioning index (SCI)*	*STIR value*	*Wind & irrigation-induced erosion for SCI, t/ac/yr*	*Equiv. diesel use, gal/ac*	*Energy use, BTU/ac*	*Fuel cost, US$/ac*
Erosion on Grass Pasture	a.Single Year/Single Crop Templates\A_Pasture; fall planted, 5 yrs rotational grazing, manure application, CMZ 71	a. rows up-and-down hill	(none)	(none)	1.4	0.65	37.5	0	20	2700000	58.9

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	Tract #	Field name
Aguiar Dairy	103	Darren Hill, Forest

Location	Soil	T value, t/ac/yr	Slope length (horiz), ft	Avg. slope steepness, %
Oregon\Tillamook County\OR_Tillamook_R80-90	20D Klootchie-Necanicum complex, 5 to 30 percent slopes\Klootchie slightly decomposed plant material 60%	5.0	590	18

Alternatives:

Description	Management	Contouring	Strips / barriers	Diversion/terrace, sediment basin	Cons. plan. soil loss	Soil conditioning index (SCI)	STIR value	Wind & irrigation-induced erosion for SCI, t/ac/yr	Equiv. diesel use, gal/ac	Energy use, BTU/ac	Fuel cost, US$/ac
Erosion on Grass Pasture	a.Single Year/Single Crop Templates\A_Pasture; fall planted, 5 yrs rotational grazing, manure application, CMZ 71	a. rows up-and-down hill	(none)	(none)	5	0.76	37.5	0	20	2700000	58.9

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	Tract #	Field name
Aguiar Dairy	221	McD2

Location	Soil	T value, t/ac/yr	Slope length (horiz), ft	Avg. slope steepness, %
Oregon\Tillamook County\OR_Tillamook_R80-90	57B Condorbridge gravelly medial loam, 0 to 7 percent slopes\Condorbridge gravelly medial loam 85%	5.0	900	7.0

Alternatives:

Description	Management	Contouring	Strips / barriers	Diversion/terrace, sediment basin	Cons. plan. soil loss	Soil conditioning index (SCI)	STIR value	Wind & irrigation-induced erosion for SCI, t/ac/yr	Equiv. diesel use, gal/ac	Energy use, BTU/ac	Fuel cost, US$/ac
Erosion on Grass Pasture	a.Single Year/Single Crop Templates\A_Pasture; fall planted, 5 yrs rotational grazing, manure application, CMZ 71	a. rows up-and-down hill	(none)	(none)	3.0	0.52	37.5	0	20	2700000	58.9

The **SCI** is the **Soil Conditioning Index** rating. If the calculated index is a negative value, soil organic matter levels are predicted to decline under that production system. If the index is a positive value, soil organic matter levels are predicted to increase under that system.

The **STIR** value is the **Soil Tillage Intensity Rating**. It utilizes the speed, depth, surface disturbance percent and tillage type parameters to calculate a tillage intensity rating for the system used in growing a crop or a rotation. STIR ratings tend to show the differences in the degree of soil disturbance between systems. The kind, severity and number of ground disturbing passes are evaluated for the entire cropping rotation as shown in the management description.

SOIL AND RISK ASSESSMENT

OREGON PHOSPHORUS INDEX

FIELD SUMMARY & WESTERN OREGON P INDEX

Enter data in gray cells and select best choice from drop down menus.
Cells with blue font are completed automatically.

Grower:	Aguiar Dairy
Application Plan by:	Tom Thomson
Date:	May 9, 2017

	Field	1	2	3	4	5	6	7	Darren
	Acres	7.5	7.3	5.7	6.9	8.0	5.6	7.2	5.7
	Soil	92A, Yachats	77A, Nestucca	77A, Nestucca	170A, Logsden	170A, Logsden	74A, Nehalem	74A, Nehalem	93B, Gauldy
	Soil test date	September 17, 2015	September 17, 2015	September 17, 2015	September 17, 2015	September 17, 2015	September 22, 2015	September 22, 2015	January 25, 1900
	Bray 1 P (ppm)	23	23	29	29	50	4	23	30
	Acetate K (ppm)	639	639	1,007	1,007	875	497	805	841
	pH	5.6	5.6	5.4	5.4	5.4	5.4	5.4	5.2
	SMP	5.6	5.6	5.5	5.5	5.3	5	5.4	5
TRANSPORT FACTORS									
	Sheet & rill erosion (tons/ac-yr)	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3
	Irrigation erosion (tons/ac-yr)	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff
	Runoff Class	negligble	medium	medium	low	low	low	low	medium
	Flooding Frequency	frequent	frequent	frequent	rare	rare	occasional	occasional	frequent
	Distance to stream (ft)	< 100 ft	< 100 ft	< 100 ft	100-199 ft	< 100 ft	100-199 ft	< 100 ft	< 100 ft
	Buffers	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.
	Drainage	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles
SOURCE FACTORS									
	Commercial P2O5 rate (lbs/ac)	0	0	0	0	0	0	0	0
	Commercial P2O5 method	None applied	None applied	None applied	None applied	None applied	None applied	None applied	None applied
	Commercial P2O5 timing	None applied	None applied	None applied	None applied	None applied	None applied	None applied	None applied
	Organic P2O5 rate (lbs/ac)	139	139	139	139	139	139	139	138
	Organic P2O5 method	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days
	Organic P2O5 timing	All months possible	All months possible	All months possible	All months possible	All months possible	All months possible	All months possible	All months possible
SCORE		16.0	18.0	18.0	14.8	15.8	15.5	15.5	18.0
P RUNOFF RISK RATING		Medium	Medium	Medium	Medium	Medium	Medium	Medium	Medium

COMMENTS

SOIL AND RISK ASSESSMENT

FIELD SUMMARY & WESTERN OREGON P INDEX

Enter data in gray cells and select best choice from drop down menus.
Cells with blue font are completed automatically.

Grower:	Aguiar Dairy
Application Plan by:	Tom Thomson
Date:	May 9, 2017

Field	Darren Hill	Forest	McD1	McD2	McD3	Rental		
Acres	2.2	11.3	19.5	5.8	14.9	41.5		
Soil	20D, Klootchie	20D, Klootchie	74A, Nehalem	57B, Condorbridge	74A, Nehalem	74A, Nehalem	TILLAMOOK COUNTY	TILLAMOOK COUNTY
Soil test date	September 17, 2015	September 17, 2015	September 22, 2015	September 22, 2015	September 22, 2015	September 22, 2015		
Bray 1 P (ppm)	30	51	13	13	8	9		
Acetate K (ppm)	841	959	773	773	579	356		
pH	5.2	5.7	5.4	5.4	5.1	5.5		
SMP	5	5.4	5.4	5.4	5.1	5.4		
TRANSPORT FACTORS								
Sheet & rill erosion (tons/ac-yr)	4-6	4-6	1-3	1-3	1-3	1-3	<1	<1
Irrigation erosion (tons/ac-yr)	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	no irrig. runoff	not irrigated	not irrigated
Runoff Class	medium	medium	low	high	low	low	none	none
Flooding Frequency	none	none	occasional	none	occasional	occasional	none	none
Distance to stream (ft)	100-199 ft	300-500 ft	<100 ft	<100 ft	<100 ft	<100 ft	>500 ft	>500 ft
Buffers	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.	> 30 ft or NRCS spec.
Drainage	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles	no tiles
SOURCE FACTORS								
Commercial P2O5 rate (lbs/ac)	0	0	0	0	0	0	0	0
Commercial P2O5 method	None applied	None applied	None applied	None applied	None applied	None applied	None applied	None applied
Commercial P2O5 timing	None applied	None applied	None applied	None applied	None applied	None applied	None applied	None applied
Organic P2O5 rate (lbs/ac)	138	138	138	138	138	137	0	0
Organic P2O5 method	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	Not incorp. in 5 days	None applied	None applied
Organic P2O5 timing	All months possible	All months possible	All months possible	All months possible	All months possible	All months possible	None applied	None applied
SCORE	16.5	17.6	15.5	17.0	15.5	15.5	0.0	0.0
P RUNOFF RISK RATING	Medium	Medium	Medium	Medium	Medium	Medium	Low	Low

COMMENTS

SOIL AND RISK ASSESSMENT

SOIL AND RISK ASSESSMENT

Oregon Phosphorus Index Risk Interpretation

P Index rating	Interpretation	Recommended Nutrient Limitation
West PI Score<13 East PI Score<30	Low potential for P movement from this site given current management practices and site characteristics. There is a low probability of an adverse impact to surface waters from P losses on this site. Soil test P and P losses are likely to increase in future due to N-based nutrient management from animal manure.	Nitrogen
West PI Score 13-25 East PI Score 30-100	Medium potential for P movement from this site given current management practices and site characteristics. Practices should be introduced to reduce P losses by surface runoff, subsurface flow, and erosion. Soil test P and P losses are likely to increase in future due to N-based nutrient management from animal manure.	Nitrogen
West PI Score >25-50 East PI Score >100-400	High potential for P movement from this site given current management practices and site characteristics. All practicable management practices to reduce P losses through surface runoff, subsurface flow, or erosion should be implemented.	Phosphorus
West PI Score >50 East PI Score >400	Very high potential for P movement from this site given current management practices and site characteristics. Active remediation techniques should be implemented in an effort to reduce the P loss potential from this site.	No manure

SOIL AND RISK ASSESSMENT

REFERENCES

PUBLICATIONS AND SOFTWARE

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http://www.nap.edu/openbook.php?isbn=0309069971

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Feed Management

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http://efotg.sc.egov.usda.gov/references/public/OR/633js042707.pdf

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Phosphorus Assessment

Agronomy Technical Note No. 26: The Phosphorus Index, Oregon NRCS, June 2008
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Agricultural Phosphorus Management Using the Oregon/Washington Phosphorus Indexes,
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Practice Standards

Oregon NRCS Waste Recycling Standard (633), July 2013
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Record Keeping

Oregon ODA CAFO Recordkeeping Calendar, January 2015
http://www.oregon.gov/ODA/NRD/pages/cafoprogdocs.aspx

Water Quality/Quantity

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ftp://ftp-fc.sc.egov.usda.gov/OR/Technical_Notes/Water%20Quality/WaterQual01.pdf

Software

Revised Universal Soil Loss Equation, RUSLE2 version 1.26.6.4, October 2006
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Oregon Animal Waste Management Planning Tool, ORAWMv5.2, July 2016
http://www.oregon.gov/ODA/NRD/pages/cafoprogdocs.aspx

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ORAWM WORKBOOK

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 5.2

5/9/2017

CLIENT: AGUIAR DAIRY

ASSISTED BY: Northwest Ag Consulting - Tom Thomson

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

ANIMAL INVENTORY

Type of Animal	Number of Animals	Average Weight (lbs.)	Animal Units (1,000 lb.)	Milk Production in Pounds/Cow/Day= 65						Manure CF/D/AU	Annual		
				Nutrient Production (lbs./day/1000 lb. Animal Unit)			(lbs./day)				Days Confined	Days Grazed	Days Off Farm
				N	P	K	N	P	K				
MILKER (Holstein)	235	1,300	305.5	0.69	0.12	0.32	210.80	35.87	96.72	1.67	181	184	0
MILKER (DRY)	40	1,400	56.0	0.30	0.04	0.10	16.80	2.35	5.60	0.92	161	204	0
HEIFERS (12-24 Months)	70	750	52.5	0.27	0.05	0.12	13.97	2.39	6.30	0.90	161	204	0
CALVES (1-12 Months)	40	100	4.0	0.42	0.05	0.11	1.68	0.22	0.44	1.34	365	0	0
Totals/Averages-	385	888	418.0	0.58	0.10	0.26	243.2	40.8	109.1	1.5			

GRAZING PERIOD

Type of Animal	Percent of Month and Number of Animals Grazing												AU-YR.
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
MILKER (Holstein)	90%	0%	0%	0%	0%	30%	45%	75%	90%	90%	90%	90%	
	235	235	235	235	235	235	235	235	235	235	235	235	1,833
MILKER (DRY)	100%	0%	0%	0%	0%	30%	50%	85%	100%	100%	100%	100%	
	40	40	40	40	40	40	40	40	40	40	40	40	372
HEIFERS (12-24 Months)	100%	0%	0%	0%	0%	30%	50%	85%	100%	100%	100%	100%	
	70	70	70	70	70	70	70	70	70	70	70	70	349
CALVES (1-12 Months)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	40	40	40	40	40	40	40	40	40	40	40	40	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>>>	383	0	0	0	0	124	192	321	383	383	383	383	2,555
Total AUM's>>>>>>>>>>	-383	0	0	0	0	-124	-192	-321	-383	-383	-383	-383	-2,555

Page 1 of 3

Aguiar ORAWMv5.2

REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 5.2

5/9/2017

CLIENT: AGUIAR DAIRY
ASSISTED BY: Northwest Ag Consulting - Tom Thomson

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

WEATHER STATION TILLAMOOK 1 W

Month	25Yr-24Hr	6.00	Lot Runoff Factors as a Percent of Monthly Precipitation	
	RCN=	95.00		
	Average Monthly Inches			
	Precipitation	Evaporation	Paved	Unpaved
October	7.16	1.42	50%	20%
November	13.71	0.75	60%	25%
December	13.94	0.60	60%	25%
January	13.09	0.48	60%	25%
February	10.79	0.78	50%	25%
March	9.90	1.26	45%	15%
April	6.81	1.90	40%	15%
May	4.84	3.22	40%	10%
June	3.41	3.40	35%	10%
July	1.64	3.91	30%	0%
August	1.42	3.52	40%	10%
September	3.68	2.54	45%	15%
Annual	90.39	23.78		

AREAS CONTRIBUTING RUNOFF TO LIQUID STORAGE FACILITY

Description of Runoff Area	Area in SF
Paved Lot Area >>	0
Is paved lot scraped daily? (Y/N) NO	
Unpaved Lot Area >>	0
Roof Area >>	0
Surface Area of Silage Storage Facility>>>>>>>>>>>>>>>>>>>>>>>>>>>>>	0
Does Silage Seepage Drain to Storage Facility? (Y/N) NO	
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	235	2	0.10	47	6.3
Equipment Wash		2	900.00	1800	240.6
Flushwater		2	0.00	0	0.0
Miscellaneous		2	25.00	50	6.7
Total>>				1897	253.6

CROP DATA

Field Number	Acres	Crop	Percent Dry Matter (DM)	Yield Units	Target Yield	Nutrients Removed in Pounds per Acre: Nitrogen N	Phosphorous P_2O_5	Potassium K_2O
Dairy	59.4	Grass Hay/Pasture	85%	Ton	6.00	296	93	246
McD	40.2	Grass Hay/Pasture	85%	Ton	6.00	296	93	246
Rental	41.5	Grass Hay/Pasture	85%	Ton	6.00	296	93	246
Darren	7.9	Grass Hay/Pasture	85%	Ton	6.00	296	93	246
Off Farm								
Total Acres-	149.0							

REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 5.2

5/9/2017

CLIENT: AGUIAR DAIRY

ASSISTED BY: Northwest Ag Consulting - Tom Thomson

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
MILKER (Holstein)	Free Stall	Sawdust	12.00	3.10	0.15	46	947
MILKER (DRY)	Free Stall	Wood Shavings	9.00	3.10	0.34	19	174
HEIFERS (12-24 Months)	Free Stall	Wood Shavings	9.00	3.10	0.34	18	163
CALVES (1-12 Months)	Loose Housing	Loose Straw	2.50	9.30	0.25	1	37

SOLIDS SEPARATION FACTOR

Type of Animal	Type of Separator	% Solids Separated	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
MILKER (Holstein)	Dry Scrape System	0%	0	555	510	0	292	36	0
MILKER (DRY)	Dry Scrape System	0%	0	71	52	0	14	36	0
HEIFERS (12-24 Months)	Dry Scrape System	0%	0	65	47	0	21	36	0
CALVES (1-12 Months)	Dry Scrape System	100%	6	0	0	5	0	36	229
Totals>>			6	691	608	5	327		229

REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 5.2

5/9/2017

CLIENT: **AGUIAR DAIRY**
ASSISTED BY: **Northwest Ag Consulting - Tom Thomson**

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY VOLUMES

Month	Runoff in Cubic Feet				Facility Water Use	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	Cubic Feet	Solids Cubic Feet	Liquids Cubic Feet	Cubic Feet	Pounds	Cubic Feet	Pounds	Cubic Feet	Pounds	Cubic Feet	Cubic Feet
October	0	0	0	0	7,862	218	1,527	173	4,089	197	7,098	1,722	61,983	197	9,584
November	0	0	0	0	7,608	2,350	16,061	2,511	39,618	191	6,869	20,732	746,344	191	28,340
December	0	0	0	0	7,862	2,429	16,596	2,595	40,939	197	7,098	21,423	771,222	197	29,285
January	0	0	0	0	7,862	2,429	16,596	2,595	40,939	197	7,098	21,423	771,222	197	29,285
February	0	0	0	0	7,101	2,194	14,990	2,344	36,977	178	6,411	19,350	696,587	178	26,451
March	0	0	0	0	7,862	1,706	11,662	1,826	29,003	197	7,098	14,996	539,855	197	22,858
April	0	0	0	0	7,608	1,281	8,770	1,339	21,788	191	6,869	11,199	403,163	191	18,807
May	0	0	0	0	7,862	580	3,995	558	10,057	197	7,098	4,935	177,666	197	12,797
June	0	0	0	0	7,608	211	1,478	167	3,957	191	6,869	1,666	59,983	191	9,274
July	0	0	0	0	7,862	218	1,527	173	4,089	197	7,098	1,722	61,983	197	9,584
August	0	0	0	0	7,862	218	1,527	173	4,089	197	7,098	1,722	61,983	197	9,584
September	0	0	0	0	7,608	211	1,478	167	3,957	191	6,869	1,666	59,983	191	9,274
Annual	0	0	0	0	92,568	14,045	96,208	14,623	239,501	2,321	83,570	122,555	4,411,973	2,321	215,122
Annual Gallons	0	0	0	0	692,405	105,057	719,637	109,380		17,364		916,710		17,364	1,609,115

DAILY NUTRIENT PRODUCTION

Type of Animal	Pounds/Day of Nutrients from LIQUIDS			Pounds/Day of Nutrients from SOLIDS			Pounds/Day of Nutrients from GRAZING			Grazing Manure	Confined Manure
	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O	Gallons/Yr	Cubic Feet/Yr
MILKER (Holstein)	246.79	98.56	271.78	0.00	0.00	0.00	210.80	82.17	116.55	700,384	92,360
MILKER (DRY)	19.67	6.46	15.74	0.00	0.00	0.00	16.80	5.39	6.75	78,481	8,313
HEIFERS (12-24 Months)	16.35	6.56	17.70	0.00	0.00	0.00	13.97	5.47	7.59	71,976	7,624
CALVES (1-12 Months)	0.00	0.00	0.00	1.33	0.70	2.56	0.00	0.00	0.00	0	1,956
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0
									Total-	850,841	110,253

REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 5.2

5/9/2017

CLIENT: **AGUIAR DAIRY**
ASSISTED BY: **Northwest Ag Consulting - Tom Thomson**

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY NUTRIENT PRODUCTION

Month	Pounds of Nutrients from LIQUIDS			Pounds of Nutrients from SOLIDS			Pounds of Nutrients from GRAZING			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
October	765	306	843	41	22	79	6,835	2,629	3,696	7,641	2,956	4,618
November	8,484	3,348	9,157	40	21	77	0	0	0	8,524	3,369	9,233
December	8,767	3,459	9,462	41	22	79	0	0	0	8,808	3,481	9,541
January	8,767	3,459	9,462	41	22	79	0	0	0	8,808	3,481	9,541
February	7,919	3,124	8,546	37	20	72	0	0	0	7,956	3,144	8,618
March	6,137	2,421	6,623	41	22	79	2,247	865	1,217	8,425	3,308	7,920
April	4,612	1,822	4,986	40	21	77	3,307	1,272	1,789	7,959	3,115	6,851
May	2,080	824	2,262	41	22	79	5,712	2,197	3,088	7,833	3,043	5,429
June	740	296	815	40	21	77	6,614	2,544	3,577	7,395	2,861	4,469
July	765	306	843	41	22	79	6,835	2,629	3,696	7,641	2,956	4,618
August	765	306	843	41	22	79	6,835	2,629	3,696	7,641	2,956	4,618
September	740	296	815	40	21	77	6,614	2,544	3,577	7,395	2,861	4,469
Annual	**50,543**	**19,966**	**54,655**	**484**	**255**	**934**	**44,999**	**17,310**	**24,336**	**96,026**	**37,531**	**79,925**

MONTHLY IMPORTS INTO STORAGE FACILITIES

Month	Liquids		Solids	
	Cubic Feet	Gallons	Cubic Feet	Tons
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
January	0	0	0	0
February	0	0	0	0
March	0	0	0	0
April	0	0	0	0
May	0	0	0	0
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
Totals	**0**	**0**	**0**	**0**

REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 5.2

5/9/2017

CLIENT: **AGUIAR DAIRY**
ASSISTED BY: **Northwest Ag Consulting - Tom Thomson**

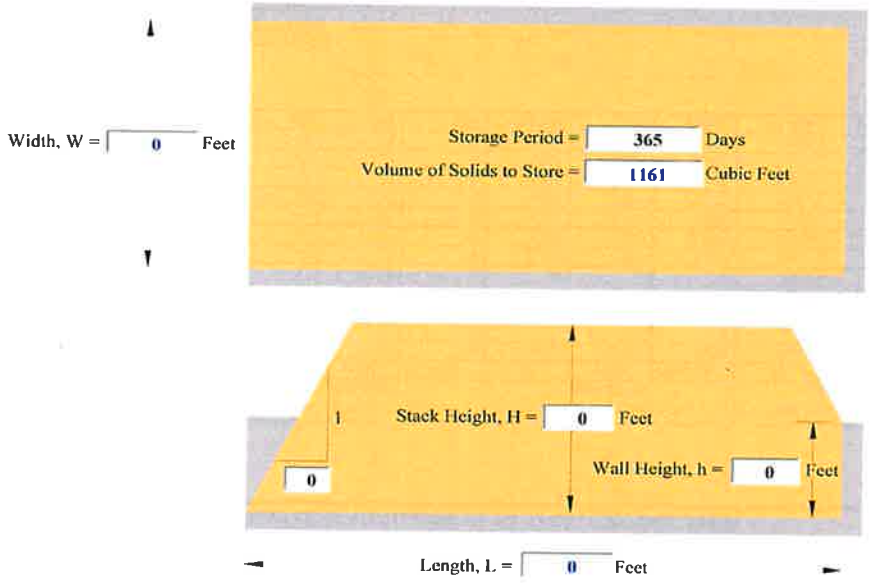
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

SOLIDS STACKING FACILITY

Solids Storage Facility Parameters	Value
Storage Period, Days=	365
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=	3,900
Surface Area of Existing Storage, SF=	600
25 Year-24 Hour Storm Runoff, CF=	271
Volume Needed, Cubic Feet=	1,161
Design Volume, Cubic Feet=	0
Is Facility Covered?	YES
Volume Reduction Factor=	0.50

VOLUME OF MONTHLY SOLIDS STACKED IN FACILITY

Month	Number of Days	Manure CF	Bedding CF	Solids to Store CF	Solids to Store Tons	Normal Runoff CF
October	31	166	31	99	4	72
November	30	161	30	95	3	171
December	31	166	31	99	4	174
January	31	166	31	99	4	164
February	28	150	28	89	3	135
March	31	166	31	99	4	74
April	30	161	30	95	3	51
May	31	166	31	99	4	24
June	30	161	30	95	3	17
July	31	166	31	99	4	0
August	31	166	31	99	4	7
September	30	161	30	95	3	28
Annual	365	1,956	365	1,160	42	917



Aguiar ORAWMv5.2

REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 5.2

5/9/2017

CLIENT **AGUIAR DAIRY**
ASSISTED BY: **Northwest Ag Consulting - Tom Thomson**

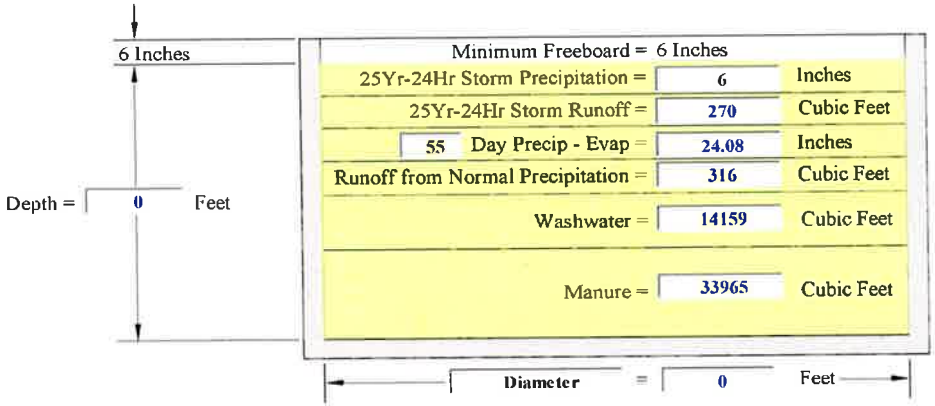
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

TANK

Tank Parameters	Value
Storage Period, Days=	55
Tank Diameter, Feet=	0
Existing Storage, Cubic Feet=	60,507
Surface Area of Existing Storage, SF=	2,827
25 Year-24 Hour Storm Runoff, CF=	270
Volume Needed, Cubic Feet=	60,416
Design Volume, Cubic Feet=	0
Is Tank Covered?	NO
Tank Dimensions?	Circular

MONTHLY INFLOWS INTO TANK

Month	Number of days	Rain-Evap on Tank CF	Rain-Evap on Existing Storage, CF	Normal Runoff CF	Washwater CF	Solids CF	Imported Liquids CF	Waste to Store CF	Waste to Store Gallons
October	31	0	1,352	72	7,862	1,722	0	11,007	82,342
November	30	0	3,053	171	7,608	20,732	0	31,565	236,120
December	31	0	3,143	174	7,862	21,423	0	32,602	243,877
January	31	0	2,971	164	7,862	21,423	0	32,419	242,511
February	28	0	2,358	135	7,101	19,350	0	28,944	216,515
March	31	0	2,035	74	7,862	14,996	0	24,968	186,770
April	30	0	1,157	51	7,608	11,199	0	20,015	149,723
May	31	0	382	24	7,862	4,935	0	13,203	98,765
June	30	0	2	17	7,608	1,666	0	9,294	69,523
July	31	0	-535	0	7,862	1,722	0	9,049	67,690
August	31	0	-495	7	7,862	1,722	0	9,096	68,043
September	30	0	269	28	7,608	1,666	0	9,571	71,593
Annual	365	0	15,692	917	92,568	122,555	0	231,732	1,733,472



REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)

Version 5.2

5/9/2017

CLIENT: **AGUIAR DAIRY**
ASSISTED BY: **Northwest Ag Consulting - Tom Thomson**

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	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O
Liquids	Dairy / Tank Manure Analysis	50,513	19,966	54,655	70%	85%	85%	35,380	16,971	46,457
Solids	Solids Storage Manure Analysis	484	255	934	70%	90%	90%	339	230	840
Grazing	NONE	44,999	17,310	24,336	100%	100%	100%	44,999	17,310	24,336

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	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O
Liquids	Sprinkler	35,380	16,971	46,457	75%	100%	100%	26,535	16,971	46,457
Solids	Broadcast (Incorporated 2 or more days after application)	339	230	840	70%	100%	100%	237	230	840
Grazing	Grazing	44,999	17,310	24,336	65%	100%	100%	29,249	17,310	24,336

NUTRIENTS AVAILABLE AFTER DENITRIFICATION

Nutrient Source	Location / Coast / Soil Drainage Class	Pounds of Nutrients Available			Percent Nutrients Retained After Denitrification			Pounds of Nutrients Retained After Denitrification		
		N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O
Liquids	Wet Drained	26,535	16,971	46,457	87%	100%	100%	23,086	16,971	46,457
Solids	Wet Drained	237	230	840	87%	100%	100%	207	230	840
Grazing	Wet Drained	29,249	17,310	24,336	87%	100%	100%	25,447	17,310	24,336
							TOTAL=	**48,739**	**34,511**	**71,633**

REFERENCES

OREGON ANIMAL WASTE MANAGEMENT DESIGN AID (ORAWM)
Version 5.2

5/9/2017

CLIENT **AGUIAR DAIRY**
ASSISTED BY **Northwest Ag Consulting - Tom Thomson**

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
Dairy	59.4	Grass Hay/Pasture	8%	1,847	6	8%	17	0	40%	10,145	34
MelD	40.2	Grass Hay/Pasture	5%	1,154	4	5%	10	0	27%	6,866	23
Rental	41.5	Grass Hay/Pasture	5%	1,154	4	5%	10	0	28%	7,085	24
Darren	7.9	Grass Hay/Pasture	1%	231	1	1%	2	0	5%	1,349	5
Off Farm			81%	28,658		81%	275		0%	0	
TOTALS-	149		100%	33,044	15	100%	314	0	100%	25,447	86

NUTRIENT BALANCE BASED ON AVAILABLE ACRES

Field Number	Acres	Crop	NUTRIENTS APPLIED			- NUTRIENTS REMOVED			= NUTRIENT BALANCE		
			Nitrogen, N Lbs/Acre	Phosphorous, P2O5 Lbs/Acre	Potassium, K2O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P2O5 Lbs/Acre	Potassium, K2O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P2O5 Lbs/Acre	Potassium, K2O Lbs/Acre
Dairy	59.4	Grass Hay/Pasture	202	139	227	296	93	246	-94	46	-19
MelD	40.2	Grass Hay/Pasture	200	138	222	296	93	246	-96	44	-24
Rental	41.5	Grass Hay/Pasture	199	137	220	296	93	246	-97	43	-26
Darren	7.9	Grass Hay/Pasture	200	138	223	296	93	246	-96	44	-23
Off Farm											

REFERENCES

REFERENCES

OREGON DEPARTMENT OF AGRICULTURE
MODIFICATION OF ANIMAL NUMBERS
National Pollutant Discharge Elimination System
(NPDES PERMIT)

Statutory Authority
Oregon Revised Statutes (ORS) 468B.050 When permit required
ORS 468B.210 Maximum numbers of animals based on ability to contain, treat, hold and dispose of wastes as necessary to comply with all conditions of the permit.

A. General Information **Master Address #AG-P1000117CAFG EPA#ORG010691**

Name or Business Name – Aguiar Dairy

Facility Location Address – 15555 Moss Creek Road

City – Bay City, OR **Zip Code 97107** **County - Tillamook**

B. Livestock Type: Circle the item that best represents your operation.

1. Beef Feedlot (Fattening) 2. Beef Cattle (Cow/calf) 3. Hogs 4. Sheep and Goats
5. Dairy Farm, Heifer Replacement Farm 6. Poultry/Broiler 7. Poultry/Eggs
7. Mink/Rabbits 8. Horses and Other Equine 9. Other_____

C. Current Permitted Animal Numbers: In the space below please describe your number of animals by herd composition or class.
Aguiar Dairy is a Medium Concentrated CAFO currently permitted for 300 dairy animals- 206 Milking and Dry Cows and 96 Heifers and Calves.

D. Current Permitted CAFO Designation: Circle one. See reverse side for table.

Large Concentrated Medium Concentrated (Medium Confined) Small Confined Small Concentrated

E. Proposed change in permitted animal numbers: In the space below please describe your proposed animal numbers by herd composition or class.
Aguiar is requesting to be permitted for 385 dairy animals- 275 Milking and Dry Cows and 110 Heifers and Calves.

F. New CAFO Designation based on increase / decrease in animal numbers. Circle one. See reverse side for table.

Large Concentrated Medium Concentrated (Medium Confined) Small Confined Small Concentrated

G. Certification:
I understand that an approved animal waste management plan is required prior to permit increase. I agree to prepare and implement an animal waste management plan in accordance with the requirements and timelines specified in the permit.

_____	_____	Manny and Cathy Aguiar
Signature (operator or owner)	Date	Print Name
_____	_____	_____
Signature (operator or owner)	Date	Print Name

REFERENCES

Definition of Legally Authorized Representative:
See 40 CFR 122.22 for more detail. Please also provide the information requested in brackets [ ]

- **Corporation** — President, secretary, treasurer, vice-president, or any person who performs principal business functions; or a manager of one or more facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million that is authorized in accordance to corporate procedure to sign such documents
- **Partnership** — General partner *[list of general partners, their addresses, and telephone numbers]*
- **Sole Proprietorship** — Owner(s) *[each owner must sign the application]*
- **City, County, State, Federal, or other Public Facility** — Principal executive officer or ranking elected official
- **Limited Liability Company** — Member *[articles of organization]*
- **Trusts** — Acting trustee *[list of trustees, their addresses, and telephone numbers]*

SEND THIS FORM TO:

Oregon Department of Agriculture
Natural Resources Division
635 Capitol Street NE
Salem, Oregon 97301-2532

ANIMAL MODIFICATION REQUEST INSTRUCTIONS

A. GENERAL INFORMATION:

1. Enter the legal name.
2. Enter the common name of the facility or operation, if different than the legal name.
3. Enter the facility's physical address (physical location), including city, state, zip code and telephone number.

B. CIRCLE THE APPROPRIATE LIVESTOCK TYPE OF YOUR OPERATION.

C. Self-explanatory

D. Self-explanatory

E. Describe your proposed animal increase by herd composition or class

F. Self-explanatory

G. Signature

CAFO Designation by Size Threshold (used for items D and F)

	Confined		Concentrated		
	Confines more than one animal for more than 4 months on prepared surface		Stabled or confined and fed or maintained for total of 45 days or more in any 12-month period Crops, vegetation, forage growth, or post-harvest residues not sustained in normal growing season in lot or facility		
	Small Confined Waste water control facility or disposal system for wet wastes	***Medium Confined*** Waste water control facility or disposal system for wet or dry wastes	***Small Concentrated*** Significant contributor of pollutants to waters of the U.S. Designated by director [40CFR §122.23(b)(9)]	***Medium Concentrated*** Discharging pollutants to waters of the U.S. [40 CFR §122.23(b)(6)]	***Large Concentrated*** [40 CFR §122.23(b)(4)]
Animal sector	**Small Confined**	**Medium Confined**	**Small Concentrated**	**Medium Concentrated**	**Large Concentrated**
Mature dairy cows[1]	<200	200-699	<200	200-699	≥700
Veal calves	<300	300-999	<300	300-999	≥1,000
Cattle[2]	<300	300-999	<300	300-999	≥1,000
Swine> 55 lbs	<750	750-2,499	<750	750-2,499	≥2,500
Swine < 55 lbs	<3,000	3,000-9,999	<3,000	3,000-9,999	≥10,000
Horses	<150	150-499	<150	150-499	≥500
Sheep or lambs	<3,000	3,000-9,999	<3,000	3,000-9,999	≥10,000
Turkeys	<16,500	16,500-54,999	<16,500	16,500-54,999	≥55,000
Chickens, including laying hens or broilers w/wet waste system manure handling system)	<9,000	9,000-29,999	<9,000	9,000-29,999	≥30,000
Laying hens w/dry waste system	NA	25,000-81,999	<25,000	25,000-81,999	≥82,000
Broiler chickens w/dry waste system	NA	37,500-124,999	<37,500	37,500-124,999	≥125,000
Ducks w/other than wet waste system	<10,000	10,000-29,999	<10,000	10,000-29,999	≥30,000
Ducks w/wet waste system	<1,500	1,500-4,999	<1,500	1,500-4,999	≥5,000
Other animal type	As determined by ODA.[3]		Designated by director.	NA	NA

1 Whether milked or dry.

2 Other than mature dairy cows or veal calves; cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs.

3 To determine the number of animals that require permit coverage, ODA will compare the operation to the most similar animal type in the table.

REFERENCES

Notice of Registration and Oregon Confined Animal Feeding Operation (CAFO)
National Pollutant Discharge Elimination System (NPDES) General Permit Summary

Overview of CAFO General Permit Summary	The Oregon CAFO General Permit No. 01-2016 (permit) was issued by the Oregon Department of Agriculture (ODA) and Department of Environmental Quality (DEQ) on March 31, 2016 and became effective on **April 20, 2016**. The permit expires on **February 28, 2021**. A copy of the permit is enclosed. This Notice of Registration describes your specific permit registration information and an overview of permit requirements. Your medium CAFO was registered to CAFO Permit No. 1-2016 on **August 18, 2016** based on information provided by you as follows:

Master Address No. AG-P1000117CAFG **EPA Registration No. ORG010691**

	Operator	Legal owner, if different
Name	Manuel and Catherine Aguiar	same
Business Name	Aguiar Dairy	
Mailing Address	Same as facility address	
Facility Address	15555 Moss Creek Rd. Bay City, OR 97107	
Phone	503/321/3961	
Cell	503/624/3633	
E-mail Address	cathyaguiar@hotmail.com	
Maximum Number of Animals	The maximum number of animals that may be held at this dairy CAFO is **300** based on a herd composition of **206 mature cows and 94 heifers/calves.** You may not exceed this number by more than 10% or 25 animals; whichever is greater, without first providing ODA with a revised Animal Waste Management Plan (AWMP) and receiving written ODA approval.	
Facility Classification	Based on the type and size of your operation, ODA has determined that you operate a **Medium Confined CAFO.** *Note: Large Concentrated CAFOs have additional requirements. Please see general permit.*	

Tillamook County

Annual Permit Fee	Each fiscal year, you will be assessed an annual compliance fee of **$200.00** to maintain this registration under the general permit.
For Questions/ Additional Information	If you have questions, call your regional livestock water quality specialist for **Area I** at **(503) 842/6278** or the Salem office at **(503) 986-4699.** Additional CAFO program information is available on the Internet at http://oregon.gov/ODA/NRD/cafo_front.shtml
General Permit Conditions	The operator must be in compliance with all terms and conditions of the permit (not only this summary of the permit) at all times.
Prohibited Discharges See permit section S2.A, pg. 10 for full text.	The following types of discharges are prohibited: • Contaminated runoff from confinement or waste accumulation areas; • Overflow or discharges from waste storage facilities; • Discharges due to improper land application activities from seepage below the root zone, surface drainages or field tile outlets; • Discharges due to equipment failure; and • Leakage or seepage from facilities in the production area in excess of approved designs
When Discharge is Allowed Permit sections S2.B, pg. 10; G14, Pg. 24, S2.C, Pg. 10, 11	***Production Area:*** Discharges of process waste water to surface waters of the state are generally prohibited except: • When rainfall events cause an overflow of waste management and storage facilities designed, constructed, operated, and maintained to contain all manure, litter and process wastewaters including the runoff and direct precipitation from a 25-year, 24-hour rainfall event; and the production area is operated in accordance with the applicable inspection, maintenance, recordkeeping, and reporting requirements of this permit. • All authorized discharges from the production area must be properly land applied or otherwise handled in a way that minimizes impacts on surface water and groundwater sources. ***Land Application Area:*** Registrant must apply manure, litter and process wastewater to land at

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REFERENCES

	agronomic rates in accordance with the permit registrant's ODA-approved AWMP.
Animal Waste Management Plan (AWMP) Requirement Permit section S3, pg. 13-16.	The permit requires that each permitted operation have a current AWMP approved by ODA. An AWMP describes how a CAFO is managed with respect to containment, treatment, storage, and utilization of manure, litter, and process wastewater in order to remain in compliance with permit conditions and water quality laws. The AWMP must accurately represent current land base, manure storage, herd/flock size, and current management practices used at the livestock operation. The AWMP must reflect production practices and be implemented accordingly.
Storage Requirement Permit section S2.E, pg. 11.	You must provide adequate storage capacity for solid and liquid wastes at all times so that land application occurs only during periods when soil and weather conditions allow for agronomic application and are in compliance with the Land Application Limitations in S2.C.
Monitoring, Recordkeeping & Reporting Permit section S4, pg. 17-20.	Monitoring, recordkeeping and reporting of waste applications, and inspection requirements must occur as described in an AWMP approved by ODA and requirements in section S4. of the permit. *Note: Large concentrated CAFOs have additional requirements.*
Land Application Rates & Timing Permit sections S2.C, pg. 10 & 11; S3.C, pg. 13 & 14.	You must apply manure, litter and process wastes to lands at agronomic rates in accordance with the permit registrant's ODA-approved AWMP. Waste applications must not exceed the capacity of the soil and crops to assimilate nutrients and minimize water pollution, must be quantifiable, and based on the NRCS Phosphorous Index, Agronomy Technical Note #26, revised June 2008, and must account for all other nitrogen and phosphorus. ***Prohibitions:*** If discharge to surface water or groundwater will result, application to flooded and saturated land is prohibited. Proposed waste and wastewater application to frozen soil must be included in an AWMP. Land application of wastes or wastewater during rainfall events that are expected to result in saturated soils or surface runoff is prohibited.
Duty to Report Noncompliance Permit section S4.D.1, pg. 19.	If at any time you are unable to comply with any permit conditions, you have a duty to contact ODA immediately so the situation can be assessed and remedial actions taken if necessary. *Note: If you have a discharge to surface water or groundwater that is not allowed by the permit,* ***you must notify ODA within 24 hours of the discharge.*** *Please call your area livestock water quality specialist (see page 1 for phone number) at or CAFO Program support in Salem at* ***(503) 986-4699.***
Annual Report Permit section S4.D.2, pg. 19.	You must submit an annual report to ODA by March 15th of each year.
Construction of Waste Storage and Waste Water Control Facilities Permit section S2.E.2, pg. 11.	S2.E. 2 of the permit states that you "must site, design, construct, operate, and maintain all waste storage facilities consistent with the AWMP approved by ODA. New and modified construction of waste facilities must be approved in advance and prior to construction by ODA in conformance with ORS 468B.055 and OARs 340-051 and 603-074." Experimental or unproven technologies must receive prior approval from ODA. For all other modifications or new construction, no approval will be required. Certification forms are available from ODA.
Public Noticing & Participation Permit section S1.H, pg. 8 & 9	Prior to approving new permit coverage, renewing permit coverage, or approving proposed substantial changes to an AWMP, ODA will provide public notice and participation.

Ray Jaindl

Ray Jaindl, Director
Natural Resources and Pesticide Programs

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CAFO NPDES General Permit #01-2016
Issuance Date: March 31, 2016
Effective Date: April 20, 2016
Expiration Date: February 28, 2021

OREGON CONFINED ANIMAL FEEDING OPERATION
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
GENERAL PERMIT NUMBER 01-2016

Oregon Department of Agriculture

State of Oregon
Department of Agriculture
Confined Animal Feeding Operation Program
and
Department of Environmental Quality
Water Quality Division

DEQ
State of Oregon Department of Environmental Quality

In compliance with the provisions of Oregon Revised Statutes (ORS) Chapter 468B,
Oregon Administrative Rules (OAR) Chapter 340, Divisions 40, 45 and 51 and Chapter 603, Division 74,
the Federal Water Pollution Control Act as amended (The Clean Water Act),
Title 33 United States Code, Section 1251 et seq., and
the National Pollutant Discharge Elimination System (NPDES) program.

Until this permit expires or is modified or revoked, permit registrants who have properly obtained coverage under this permit are authorized to discharge to waters of the state in accordance with the special and general conditions that follow.

Ray Jaindl, Director
Natural Resources and Pesticides
Oregon Department of Agriculture

Lydia Emer
Operations Division Administrator
Oregon Department of Environmental Quality

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SPECIAL CONDITIONS

DEFINITIONS

1. "25-year, 24-hour rainfall event" means an event with a probable recurrence interval of once in twenty-five years as defined by the National Weather Service in Technical Paper Number 40, "Rainfall Frequency Atlas of the United States," May 1961, or equivalent regional or state rainfall probability information developed from this source.
2. "40 CFR" means Title 40 of the Code of Federal Regulations (2014).
3. "Agency" means Oregon Department of Environmental Quality or Oregon Department of Agriculture.
4. "Agricultural stormwater" is defined at 40 CFR § 122.23(e).
5. "Animal waste management plan" or "AWMP" or "waste management plan" means a written document containing the minimum elements necessary to manage manure, litter, and process wastewater from operations covered by this permit in accordance with the terms and conditions of this permit.
6. "Agronomic application rate" means the rate or amount of nutrients applied to the soil for utilization by growing or planned crops such that the crops remove the same or greater amount of nutrients provided by the agronomic application.
7. "Bedding" means any absorbent material that is used to provide animal cleanliness and comfort in a confinement system. Bedding materials include but are not limited to: straw; sawdust; wood shavings; grass seed cleanings; recycled, composted, or dried manure solids; and recycled paper products. Bedding that comes into contact with animals, manure, litter, or process wastewater is determined to be manure, litter, or process wastewater for purposes of this permit.
8. "Confined animal feeding operation" or "CAFO" as defined in OAR 603-074-0010(3) and OAR 340-051-0010(2) means:
   (a) The concentrated confined feeding or holding of animals or poultry, including but not limited to horse, cattle, sheep, or swine feeding areas, dairy confinement areas, slaughterhouse or shipping terminal holding pens, poultry and egg production facilities and fur farms:
      (i) In buildings or in pens or lots where the surface has been prepared with concrete, rock or fibrous material to support animals in wet weather; or
      (ii) That have wastewater treatment works; or
      (iii) That discharge any wastes into waters of the state; or
   (b) An animal feeding operation that is subject to regulation as a concentrated animal feeding operation pursuant to 40 CFR § 122.23.
9. "Director" means the director of the State of Oregon Department of Environmental Quality or director of the State of Oregon Department of Agriculture or their authorized designee(s).
10. "Discharge" when used without qualification means the "discharge of a pollutant." "Discharge of a pollutant" is defined at 40 CFR § 122.2.
11. "Dry waste" means any solid manure, litter, bedding, or waste feed that cannot be transferred or applied with a pump or pipe system. Precipitation that comes into contact with dry waste does not change dry waste into wet waste. Dry waste may contain urine, manure, leachate or incidental process wastewater that has been absorbed into the feces, and used bedding materials in amounts that allow the waste to retain the dry characteristic so that the material cannot be transferred or applied with a pump or through a pipe.
12. "Dry waste treatment works" means any plant or other works used for the purpose of treating, stabilizing or holding wastes as a dry, solid substance. Dry waste treatment works for purposes of this permit do not utilize pumps or pipes to transfer or apply dry waste and typically do not need any added water or liquid to transfer or apply dry waste. Dry waste treatment works include but are not limited to manure piles and covered dry manure stack storage facilities.
13. "Dry-weather discharge" means a discharge of manure, litter or process wastewater from a land application area that is not defined as Agricultural Stormwater (40 CFR 122.23(e)) and where the land application of manure, litter, or process wastewater has not met all the site-specific nutrient management practices contained in the department-approved Animal Waste Management Plan and specified in 40 CFR 122.42(e)(1)(vi)-(xi). Dry weather discharges include but are not limited to: discharges through tile drains, discharges combined with irrigation water, infiltration of nutrients below the crop root zone, discharges due to failure of manure application or irrigation equipment.
14. "Frozen soil" means soil that has a soil temperature of 32° F (or 0° C) or less in any three (3) continuous inches of the top 12 inches of soil.

15. "Groundwater" means water in a saturated zone or stratum beneath the surface of land or below a surface water body.
16. "Manure" means solids or liquids excreted from an animal or other material (for example, bedding, compost, litter, feed waste, silage leachate, raw materials such as feed or silage) that comes into contact with solid or liquid excreted from an animal .
17. "OAR" means Oregon Administrative Rule.
18. "ORS" means Oregon Revised Statute.
19. "Overflow" means the discharge of manure or process wastewater resulting from the filling of wastewater or manure storage structures beyond the point at which no more manure, process wastewater, or stormwater can be contained by the structure.
20. "Person" is defined at 40 CFR § 122.2.
21. "Point source" is defined at 40 CFR § 122.2.
22. "Pollutant" is defined at 40 CFR § 122.2.
23. "Pollution" or "water pollution" is defined at ORS 468B.005(5).
24. "Process wastewater" or "process wastes" means water directly or indirectly used in the operation of the CAFO for any or all of the following: spillage or overflow from animal or poultry watering systems; washing, cleaning or flushing pens, barns, manure pits, or other CAFO facilities; direct contact swimming, washing, or spray cooling of animals; or dust control. Process wastewater or process wastes also includes any water that comes into contact with any raw materials, products, or byproducts including manure, litter, feed, milk, eggs, or bedding. OAR 340-051-0010(5) and OAR 603-074-0010(17)
25. "Production area" means that part of a CAFO that includes the animal confinement area, the manure storage area, the raw materials storage area, and the waste containment areas. The animal confinement area includes but is not limited to open lots, housed lots, feedlots, confinement houses, stall barns, free stall barns, milkrooms, milking centers, cowyards, barnyards, medication pens, walkers, animal walkways, and stables. The manure storage area includes but is not limited to lagoons, runoff ponds, storage sheds, stockpiles, under house or pit storages, liquid impoundments, static piles, and composting piles. The raw materials storage area includes but is not limited to feed silos, silage bunkers, and bedding materials. The waste containment areas include but are not limited to settling basins, and areas within berms and diversions that separate uncontaminated stormwater. Also included in the definition of production area is any egg washing or egg processing facility, and any area used in the storage, handling, treatment, or disposal of animal mortalities. OAR 340-051-0010(6) and OAR 603-074-0010(18)
26. Quantitation Limits (QLs) – The QL is the minimum level, concentration or quantity of a target analyte that can be reported with a specified degree of confidence. It is the lowest level at which the entire analytical system gives a recognizable signal and acceptable calibration for the analyte. It is normally equivalent to the concentration of the lowest calibration standard adjusted for sample weights, volumes, preparation and cleanup procedures employed. The QL as reported by a laboratory is also sometimes referred to as the Method Reporting Limit (MRL) or Limit of Quantitation (LOQ).
27. "Saturated soil" means soil with all available pore space filled that has reached its maximum retentive capacity as defined in "Qualitative Description of Soil Wetness" (Brady, N. and Weil, R., p. 201, 2007).
28. "Setback" as defined at 40 CFR §412.4(b)(1) means a specified distance from surface water or potential conduits to surface water where manure, litter, and process wastewater may not be land applied. Examples of conduits to surface water include but are not limited to: Open tile line intake structures, sinkholes, and agricultural well heads.
29. "Treatment works" means any plant or other works used for the purpose of treating, stabilizing or holding wastes. ORS 468B.005(8)

30. "Vegetative buffer" as defined at 40 CFR §412.4(b)(2) means a narrow, permanent strip of dense perennial vegetation established parallel to the contours of and perpendicular to the dominant slope of the field for the purposes of slowing water runoff, enhancing water infiltration, and minimizing the risk of any potential nutrients or pollutants from leaving the field and reaching surface water.

31. "Waste storage facilities" means the physical system used for the isolation and retention of process wastes on the confined animal feeding operation until their ultimate utilization.

32. "Wastes" is defined at ORS 468B.005(9).

33. "Water" or "waters of the state" is defined at ORS 468B.005(10).

34. "Waters of the U.S." is defined at 40 CFR § 122.2.

35. "Wet waste" means any liquid manure, contaminated stormwater, process wastewater, liquid feed waste and silage or manure leachate. Wet waste may include solid material particles that are suspended or dissolved in the liquid.

36. "Wet waste treatment works" means any plant or other works used for the purpose of treating, stabilizing or holding wet wastes. .Wet waste treatment works for purposes of this permit include, but are not limited to: tanks or lagoons to store wet waste; pumps, pipes, curbs, gutters, and collection sumps to direct, collect, transfer, or apply wet wastes; and any system that separates dry waste from wet waste.

S1. PERMIT COVERAGE

S1.A. When is a permit required and which CAFOs are covered by this permit?

1. Any person who owns or operates a confined animal feeding operation (CAFO) that discharges to surface water of the state is required to obtain NPDES permit coverage. NPDES General Permit #01 provides coverage for the types of CAFOs listed in Table 1 below that discharge to surface water of the state. This includes concentrated animal feeding operations defined at 40 CFR § 122.23 that discharge to waters of the U.S.

2. Any person not wishing to be covered by this permit may apply for an NPDES individual permit in accordance with OAR 340-045-0030. In addition, the director may require coverage under an NPDES individual permit pursuant to the provisions in OAR 340-045-0033 and OAR 603-074-0012.

S1.B. Can I elect coverage under this permit even if my CAFO does not discharge to surface water?
Any person who owns or operates a CAFO that does not discharge to surface water of the state may voluntarily elect to be covered under this permit. Any person making such an election is subject to all applicable requirements of this permit.

Table 1: Classification of CAFOs that require coverage by NPDES General Permit #01

Type of CAFO discharging to surface water of the state	Small	Medium	Large
mature dairy cows[1]	<200	200-699	≥700
veal calves	<300	300-999	≥1,000
cattle[2]	<300	300-999	≥1,000
swine ≥ 55 lbs	<750	750-2,499	≥2,500
swine < 55 lbs	<3,000	3,000-9,999	≥10,000
horses	<150	150-499	≥500
sheep or lambs	<3,000	3,000-9,999	≥10,000
turkeys	<16,500	16,500-54,999	≥55,000
chickens, including laying hens or broilers w/wet waste system	<9,000	9,000-29,999	≥30,000
laying hens w/dry waste system	<25,000	25,000-81,999	≥82,000
broiler chickens w/dry waste system	<37,500	37,500-124,999	≥125,000
ducks w/other than wet waste system	<10,000	10,000-29,999	≥30,000
ducks w/wet waste system	<1,500	1,500-4,999	≥5,000
other animal type[3]	Designated by director.	Designated by director.	Designated by director.

[1] Whether milked or dry.
[2] Other than mature dairy cows or veal calves; cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs.
[3] To determine the number of animals that require permit coverage, ODA will compare the operation to the most similar animal type in the table.

S1.C. How do I apply for permit coverage?

1. New Application
   To obtain permit coverage for the first time, a person must submit to ODA an ODA *Application to Register* (*ATR*), Land Use Compatibility Statement (LUCS), Animal Waste Management Plan (AWMP), and application fee. The application, LUCS, AWMP, and fee must be submitted to ODA at least 180 days prior to the time permit coverage is needed or as specified by ODA in writing. For information on AWMP requirements, see S3, p. 13.

2. Renewal of Permit Coverage
   To renew permit coverage, the permit registrant must submit an ODA renewal application at least 180 days before the expiration date of this permit or as specified by ODA in the renewal notice but no later than the expiration date of this permit. Applicants must certify on their renewal application whether an AWMP is new, updated or current and on file. New and updated animal waste management plans must be submitted with the application.

3. Notification of Permit Coverage
   ODA will review the application and notify the applicant in writing when permit coverage is approved or denied. Permit coverage does not begin until written notice is issued by ODA to the applicant. Written notification will include a *Notice of Registration* that will include the following information:
   (a) The owner and operator's legal name;
   (b) Facility name and location;
   (c) Contact information, including mailing address and telephone number;
   (d) Effective date of permit coverage;
   (e) Maximum number of animals allowed at the facility; and
   (f) Regulatory status of the operation. ODA will use the following classifications for regulatory status:
      (i) *Large concentrated animal feeding operation* as defined in 40 CFR § 122.23(b)(4);
      (ii) *Medium concentrated animal feeding operation* as defined in 40 CFR § 122.23(b)(6);
      (iii) *Small concentrated animal feeding operation* as defined in 40 CFR § 122.23(b)(9) and designated by the director pursuant to OAR 603-074-0012;
      (iv) *Elective large, medium, or small CAFO* sized according to Table 1, p. 6.

S1.D. How do I transfer permit coverage to a new owner or operator?
The permit registrant must complete an ODA transfer form and submit it to ODA for approval at least 30 days before transfer of the CAFO is scheduled to occur or as specified by ODA. The form must be signed by the previous owner or operator as well as the new owner or operator. ODA will respond to the request for transfer by conducting a site inspection and a review of the permit file. ODA will notify the permit registrant and transferee in writing of transfer of coverage under this permit or deny the request with an explanation of why the request was denied.

S1.E. What activities are covered by this permit?

1. This permit covers the discharge of pollutants resulting from processes, wastes, and operations that are properly identified by the registrant through its AWMP approved by ODA.

2. This permit does not cover disposal of human wastes or treatment works that mix human and animal wastes. Any person owning or operating such a system must apply to DEQ for coverage under an individual or general permit issued pursuant to ORS 468B.050. This general permit may be used in addition to an individual or general permit issued by DEQ pursuant to ORS 468B.050 that covers some other type of wastewater at this same facility, for example, septic system wastewater.

3. Pursuant to 40 CFR § 122.23(e), precipitation-related discharges that qualify as agricultural stormwater discharges from land application areas are not subject to NPDES permit requirements. For discharges from the land application area to meet the definition of agricultural stormwater, manure and wastewater must be applied in accordance with site specific practices listed in the ODA-approved AWMP that ensure appropriate agricultural utilization of nutrients.

S1.F. How do I cancel permit coverage?

1. ODA will cancel coverage under this permit upon issuance of an appropriate individual permit by ODA and DEQ or coverage under WPCF General Permit #01 is granted by ODA.

2. Any permit registrant may request in writing to ODA that coverage under this permit be cancelled if any one of the following applies:
   (a) Conditions or standards have changed so that the CAFO no longer qualifies for or is required to have coverage under this permit.
   (b) The permit registrant no longer has animals on site and all waste storage and control facilities have been cleaned and re-purposed or decommissioned in accordance with the following requirements:
      (i) Cleaning/Re-purposing Requirements
         (1) All liquid and solid manure, litter and process wastewater must be removed from the structure(s) and either land applied according to the ODA-approved AWMP or exported according to S2.K, p. 12.
         (2) All liquid storage facilities that could fill with rain water must be flushed with clean water, the flush water land applied or exported according to S2.K, p. 12 and the remaining liquid in the structure tested to confirm the *E. coli* level is at or below the water quality standard of 406 Colony Forming Units/100ml of sample.
         (3) All liquid transfer systems are cleaned and modified so that they are not a conduit for any pollutant to enter surface water or groundwater.
      (ii) Decommissioning Requirements
         (1) All liquid and solid manure, litter and process wastewater must be removed from the structure(s) and either land applied according to the approved AWMP or exported according to S2.K, p. 12.
         (2) If the structure has a synthetic liner, the liner must be removed and disposed or recycled in a lawful manner.
         (3) After completion of [(ii)(*1*)] above, any earthen structure must be filled with soil and returned to the grade matching the surrounding area. All soil fill and remaining exposed soil must be seeded to site-appropriate grass or ground cover to prevent erosion.

3. The permit registrant must also certify that it will not commence operation of a regulated CAFO at the same location until the appropriate NPDES or WPCF permit coverage has been obtained.

4. ODA will respond to the request for cancellation by conducting a site inspection and a review of the permit file. ODA will notify the permit registrant in writing of termination of coverage under this permit or deny the request with an explanation of why the request was denied.

S1.G. Will my information be kept confidential?

Information, including the name and address of an NPDES permit applicant or permit registrant, NPDES permit applications (for example, ODA *ATRs*) and their attachments (for example, AWMPs), NPDES permits, and NPDES permit discharge data cannot be kept confidential pursuant to 40 CFR § 122.7(b) and (c), ORS 468.095(1), and ORS 192.410 to 192.505. The applicant or permittee may request that director classify other records as confidential upon a proper showing that the record is a trade secret pursuant to ORS 468.095(2).

S1.H. What are the public notice and participation requirements of this permit?

1. Prior to approving new permit coverage, renewing permit coverage, or approving proposed substantial changes to an AWMP, ODA will provide public notice and participation as detailed in Table 2, p. 9.

2. ODA may batch multiple notices as regionally appropriate.

3. Application and permit documents (for example, Application to Register, renewal application, AWMP, Land Use Compatibility Statement) will be available for public review at ODA headquarters and appropriate field offices. If available, electronic copies of documents will be provided upon request.

4. ODA will schedule public hearings if written requests for public hearing are received during the comment period from at least 10 persons or from an organization or organizations representing at least ten persons. If a hearing is scheduled, ODA will provide at least 30 days notice before the hearing is held. The public comment period will remain open for additional comments for at least seven (7) days after the public hearing.

S1.I. **Table 2: NPDES Public Notice Requirements**

	New Application	Renewal Application	AWMP Changes
Permit Action	(a) Receipt of ODA *ATR (Application to Register)* for existing operation not currently under an NPDES permit or new proposed operation	(b) Receipt of renewal application	(c) Receipt of proposed substantial change to CAFO's AWMP (See S3.D, p. 14)
Public Participation Process	(i) Public notice of a comment period of at least 35 days provided as follows: • Published in regional newspaper; • Posted on ODA and DEQ websites; and • Emailed to interested persons list maintained by ODA. (ii) Opportunity for public hearing. See S1.H.4. (iii) A written response to relevant comments will be developed by ODA and made available to interested persons.	(i) Public notice of a comment period of at least 35 days provided as follows: • Posted on ODA and DEQ websites; and • Emailed to interested persons list maintained by ODA. (ii) Opportunity for public hearing. See S1.H.4. (iii) A written response to relevant comments will be developed by ODA and made available to interested persons.	(i) Public notice of a comment period of at least 35 days provided as follows: • Posted on ODA and DEQ websites; and • Emailed to interested persons list maintained by ODA. (ii) Opportunity for public hearing. See S1.H.4. (iii) A written response to relevant comments will be developed by ODA and made available to interested persons.
Contents of Public Notice	• Name of operation • Name of operator or owner if different than operator, mailing address, and telephone number • Physical address of operation • Type of operation • Number of animals proposed • Land Use Compatibility Statement (LUCS) • Summary of AWMP	• Name of operation • City, county, and zip code • Permit registration number • Type of operation	• Name of operation • City, county, and zip code • Permit registration number • Type of operation • Overview of proposed substantial change

S2. DISCHARGE LIMITATIONS AND OPERATING REQUIREMENTS

S2.A. Prohibitions and Discharge Limitations

1. The permit registrant must not discharge manure, litter, or process wastewater to surface water and groundwater of the state except as allowed in S2.B and S2.C and provided these surface water discharges do not exceed the following effluent limits.
   (a) *E. coli* must not exeed zero organisms/100 mL or quantitation limit of 2 Colony Forming Units/100 mL or 0.0 most probable number/100 mL;
   (b) Nitrate plus Nitrite Nitrogen (NO_3+$N0_2$) must not exceed zero mg/L or quantitation limit of 0.1 mg/L;
   (c) Total Phosphorus (P) must not exceed zero mg/L or quantitation limit of 0.1 mg/L.

   Types of discharge that are prohibited include but are not limited to: contaminated runoff from confinement or waste accumulation areas; overflow or discharges from waste storage facilities; discharges due to improper land application activities from seepage below the root zone, surface drainages or field tile outlets; dry-weather discharges, discharges due to equipment failure; leakage or seepage from facilities in the production area in excess of approved designs; and discharges to underground injection control (UIC) systems.

2. Compliance with the effluent limits above must be determined by laboratory test results of a representative grab sample of the discharge taken at the time of occurrence. If a grab sample is not taken, then the permit registrant is in violation of the effluent limits.

S2.B. Production Area Limitations

1. For all CAFOs (except swine, poultry, and veal *large* CAFOs, the construction of which commenced after April 14, 2003):
   The permit registrant must not discharge manure, litter, or process wastewater to surface water of the state from the production area, except when:
   (a) Rainfall events cause an overflow of waste management and storage facilities designed, constructed, operated, and maintained to contain all manure, litter, and process wastewater, including the runoff and direct precipitation, from a 25-year, 24-hour rainfall event; and
   (b) The production area is operated in accordance with the applicable inspection, maintenance, recordkeeping, and reporting requirements of this permit.

2. For swine, poultry, and veal *large* CAFOs the construction of which commenced after April 14, 2003:
   The permit registrant must not discharge manure, litter, or process wastewater from the production area to surface water of the state.

3. The permit registrant must properly land apply manure, litter, and wastewater from the production area in a manner consistent with S2.C. All other authorized discharges from the production area must be managed to minimize impacts on surface water and groundwater of the state and meet the effluent limits in S2.A above.

4. The permit registrant must not exceed the seepage design rates approved by ODA for waste storage or animal confinement facilities in the production area and seepage to groundwater from these facilities must not violate state groundwater quality protection standards.

5. ODA will inform a permit registrant if any additional limits or controls are necessary to be consistent with the wasteload allocations in an EPA-approved or issued Total Maximum Daily Load for NPDES permit coverage or if coverage to an individual NPDES is necessary.

S2.C. Land Application Limitations

1. To prevent discharges to waters of the state, the permit registrant must apply manure, litter, or process wastewater to land application areas at agronomic rates in accordance with the permit registrant's ODA-approved AWMP. Land application areas include land under the control of the permit registrant, to which manure, litter, or process wastewater from the production area is or may be applied.

2. The permit registrant's discharges to groundwater due to seepage below the root zone of the crop or by other means must not violate state groundwater quality protection standards.

3. The permit registrant is allowed to apply manure, litter, or process wastewater to frozen soil provided:
   (a) The AWMP addresses such applications [see S3.C.2(k), p. 14];
   (b) The application does not result in a discharge to surface water or groundwater, except as allowed in S2.B and S2.C; and
   (c) Land applications do not cause or contribute to a violation of state water quality standards.

4. The permit registrant must not apply manure, litter, or process wastewater to saturated soils immediately before or during rainfall events that are expected to result in surface runoff. If the permit registrant makes such an application because it is a desired alternative to allowing waste storage or treatment works to overflow (for example, land application to saturated soils to pond wastewater onsite provides for greater protection of surface water than a direct overflow of a waste storage tank to surface water), the application will be considered a violation of this permit.

5. ODA will inform a permit registrant if any additional limits or controls are necessary to be consistent with the wasteload allocations in an EPA-approved or issued Total Maximum Daily Load for NPDES permit coverage or if coverage to an individual NPDES is necessary.

S2.D. Direct Access by Animals to Surface Water of the State in the Production Area Prohibited

The permit registrant must prevent direct animal contact with surface water of the state in the production area of its CAFO. Direct animal contact means any situation where animals in the production area have free access and are allowed to loiter or drop waste in surface water. Direct contact with surface water of the state by animals on pasture or rangeland is not, by itself, a violation of this permit.

S2.E. Waste Storage Facilities

1. The permit registrant must provide adequate storage capacity for solid and liquid wastes at all times so that land application occurs only during periods when soil and weather conditions allow for agronomic application and are in compliance with the Land Application Limitations in S2.C, p. 10 of this permit.

2. The permit registrant must site, design, construct, operate, and maintain all waste storage facilities to contain all manure, litter, process wastewater, and stormwater runoff and direct precipitation from a 25-year, 24-hour rainfall event for the storage period established in the ODA-approved AWMP. New and modified construction of waste facilities must be approved in advance and prior to construction by ODA in conformance with ORS 468B.055 and OARs 340-051 and 603-074.

3. Permit registrants with a *large* CAFO must also have depth markers in all surface liquid impoundments (for example, lagoons, ponds, tanks) designed to clearly indicate the:
   (a) Maximum design volume,
   (b) Minimum capacity necessary to contain the 25-year, 24-hour rainfall event, including additional freeboard requirements, and
   (c) Depth of manure and process wastewater.

S2.F. Prevention of System Overloading

1. The permit registrant may not increase the number of animals over 10% or 25 animals, whichever is greater, of the maximum number assigned by ODA in the *Notice of Registration and General Permit Summary* until an updated plan is approved in writing by ODA (see S3.B AWMP Submittal, p. 13, and S3.D Requirements for AWMP Updates and Changes, p. 14).

2. The permit registrant must ensure that animal numbers do not exceed the capacity of the waste storage facilities described in the ODA-approved AWMP.

S2.G. Handling of Animal Mortalities

The permit registrant must not dispose of animal mortalities in liquid manure or treatment works. Animal mortality composting is allowed and must be described in the Animal Waste Management Plan. The permit registrant must handle animal mortalities in such a way as to prevent discharge of pollutants to waters of the state (surface water and groundwater).

S2.H. Proper Operation and Maintenance
The permit registrant must at all times properly operate and maintain all facilities and systems used for process wastewater collection, storage and utilization, and correct any deficiencies found as soon as possible.

S2.I. Maintaining Compliance if System Fails
The permit registrant must control all applications and discharges upon reduction, loss, or failure of the waste storage or utilization facilities until the facilities are restored or an alternative method of storage or utilization is provided. This requirement also applies when the primary source of power is reduced, lost, or fails.

S2.J. Setback Requirement
The permit registrant must develop and maintain setbacks or vegetated buffers when manure, litter, or process wastewater application occur adjacent to any surface water, open tile intake structures, sinkholes, well heads, or other conduits to surface water or groundwater. The permit registrant must also include descriptions of setbacks, vegetated buffers, and/or equivalent measures in its AWMP. Compliant setbacks, vegetated buffers, or equivalent measures include the following:

1. 100 ft. setbacks (non-vegetated, non-managed buffers).
2. 35 ft. vegetated, managed buffers.
3. If approved by ODA, variable-width, seasonal setbacks determined by the type of manure, litter or process wastewater and application method used.
4. If approved by ODA, a demonstration that a setback or vegetated buffer is not necessary or may be reduced in size because implementation of alternative conservation practices or field-specific conditions will provide equivalent or better environmental protection than [1., 2. and 3.] above.

S2.K. Manure, Litter, or Process Wastewater Transfers

1. The permit registrant retains responsibility of the manure, litter, or process wastewater until the transfer or export is completed with the required documentation.

2. The permit registrant must maintain manure, litter, or process wastewater transfer or export records as required by S4.C.2(d), p. 19.

3. Prior to transferring manure, litter, or process wastewater to other persons, the permit registrant with a *large* CAFO must provide the recipient of manure, litter, or process wastewater with a manure nutrient analysis conducted within the previous 12 months.

S2.L. Proper Disposal of Other Wastes
The permit registrant must dispose of any chemicals or other wastes in accordance with applicable state regulation. The permit registrant must manage chemicals and wastes to prevent their disposal in any manure, litter, process wastewater, or stormwater storage or treatment system unless specifically designed to treat these wastes and the wastes and treatment systems are identified in the AWMP. The permit registrant must not dispose of chemicals or other wastes to any system used for the control of uncontaminated stormwater.

S3. ANIMAL WASTE MANAGEMENT PLAN

S3.A. Animal Waste Management Plan (AWMP) Implementation and Compliance

1. Upon registration to this permit, the permit registrant must implement its current ODA-approved AWMP developed for its CAFO.

2. The permit registrant's ODA-approved AWMP is incorporated into this permit by reference. The permit registrant must comply with all terms and conditions of its ODA-approved AWMP. Failure to comply with the ODA-approved AWMP constitutes a violation of the terms and conditions of this permit.

S3.B. AWMP Submittal and Public Notice

1. The applicant applying for permit coverage for the first time must submit its AWMP with the ATR to ODA for review and approval according to the schedule provided in S1.C, p. 7.

2. The existing permit registrant with coverage under NPDES General Permit #01 or another permit may submit its AWMP previously approved by ODA with the *Application to Register or Renewal Application* for review and approval according to the requirements in S1.C, p.7

3. AWMPs are subject to public notice requirements detailed in S1.H, p. 8.

S3.C. AWMP Elements

1. The permit registrant must ensure that its AWMP is adequate for the proposed or existing population of animals, reflective of the proposed or existing facility operation, and prepared in accordance with the terms and conditions of this permit, OAR 340-051, and OAR 603-074.

2. The AWMP must to the extent applicable include the following:
   (a) Procedures to ensure collection, handling, and storage of contaminated stormwater runoff from the production area, manure, litter, and process wastewater in compliance with the requirements of S2. Discharge Limitation and Operating Requirements. Calculations used to determine that storage capacity exists must be provided, including a demonstration that facilities are at least designed and constructed to contain all manure, litter, process wastewater, and stormwater runoff and direct precipitation from a 25-year, 24-hour rainfall event.
   (b) Procedures to ensure proper operation and maintenance of the storage facilities.
   (c) Procedures for proper management of animal mortalities. The procedures must ensure that animal mortalities are disposed of legally and are not disposed of in any storage or treatment system that is not specifically designed to treat animal mortalities.
   (d) Procedures to ensure that clean water is diverted, as appropriate, from the production area.
   (e) Procedures to prevent direct contact of confined animals with surface water.
   (f) Identification of appropriate site-specific conservation practices to be implemented, including buffers, setback areas, or equivalent practices, to control runoff of pollutants to surface water and groundwater.
   (g) Protocols to land apply manure, litter, or process wastewater in accordance with site-specific nutrient management practices that ensure: 1) appropriate agricultural utilization of the nutrients in the manure, litter, or process wastewater, and 2) application of nutrient at rates not to exceed the maximum agronomic application rate included in the ODA-approved AWMP. The protocols must include the following:
      (i) The NRCS Phosphorous Index, USDA/NRCS Oregon Agronomy Technical Note #26, revised October 2008 or equivalent calculation must be completed for all fields or management units that receive manure, litter or process wastewater to determine if nitrogen or phosphorous is the most limiting nutrient. The maximum nutrient application rate must be calculated for the most limiting nutrient and must account for all other nitrogen and phosphorus sources.
      (ii) Expected crop yields.
      (iii) Calculations showing the total nitrogen and phosphorus to be applied annually to each field from manure, litter, process wastewater, and other sources.
      (iv) Annual manure application rates and an explanation of the basis for determining these rates. For *large* CAFOs, these rates must be based on actual test data. For other operations, data or "book values" from established reference sources (for example, Oregon Animal Waste Management program) may be used instead of actual testing.
      (v) Method(s) used to apply manure, litter, or process wastewater

(vi) Timing of manure, litter, and process wastewater applications.

(h) For all operations, protocols for soil testing. For *large* CAFOs, protocols for testing of manure, litter, and process wastewater. For other operations that are not required to test manure, litter, or process wastewater, test protocols are not required but the references that are used to characterize manure, litter, or process wastewater must be included.

(i) If applicable, an Agricultural Compost Management Plan must be included as required by OAR 340-096 for composting activities.

(j) If applicable, a Solid Waste Conversion Technology Plan must be included as required by OAR 340-096.

(k) Frozen soil application procedures if applications of manure, litter, or process wastewater will be made to frozen soil. At a minimum, the following must be included:
  (i) Description of the potential receiving field(s), estimates of waste amounts and types, and estimated timing of applications.
  (ii) Aerial photo(s) identifying all areas and surface water bodies within 1,000 ft. of the boundaries of the receiving field(s).
  (iii) Soil map(s) identifying soil types for receiving field(s).
  (iv) Topographic map(s) for receiving field(s).
  (v) Description of the structural practices in place to ensure that no discharges to surface water occur during application and after the soil thaws.
  (vi) Description of the method used to determine when soil is frozen and management practices to be followed when planning an application and during and after an application to frozen soil.
  (vii) Description of monitoring and reporting requirements to ensure that the permit registrant is in compliance with frozen soil application procedures.
  (viii) Procedures for transfer or export of manure, litter, or process wastewater.
  (ix) Identification of specific records that will be maintained to document the implementation and management of the minimum elements described above.

S3.D. Requirements for AWMP Updates and Changes

(See Table 3, p.16, for an overview of the following requirements.)

1. Requirements for *small or medium* CAFOs electing permit coverage (see Table 3, p. 16, for an overview)

(a) *Substantial changes.* The permit registrant must submit any proposal to make substantial changes to its AWMP to ODA for approval at least 45 days in advance of implementation of the proposed changes. ODA will public notice the proposal as described in S1.H, p. 8. ODA will notify the permit registrant of its final decision concerning the proposed changes after the public notice period ends. The permit registrant must not implement a proposed change until ODA has approved it. The following types of changes to an AWMP are considered substantial:
  (i) A change in the type of manure system including but not limited to switching from a dry to a liquid manure system, switching from a liquid to a dry manure system, or changing the manure system to accommodate an animal species or type of operation not included in the scope of the current AWMP.
  (ii) An increase in maximum allowed animal numbers such that the operation becomes defined as a *large* CAFO.

(b) *Non-substantial changes.* Public notice of non-substantial changes (described below) to an AWMP is not required; however, the permit registrant must submit its proposal to make such a change to ODA for approval at least 45 days in advance of implementation of the proposed change unless a different timeframe is allowed by ODA. ODA will notify the permit registrant of its final decision concerning the proposed change after reviewing the proposal. The permit registrant must not implement a proposed change until ODA has approved it. The following changes to an AWMP are considered non-substantial provided they do not result in a substantial modification listed in paragraph (a) above:
  (i) An increase in animal numbers greater than 10% of the registrant's maximum allowed animal numbers provided the increase does not change the operation into a *large* CAFO.
  (ii) When facility expansions, production increases, or process modifications will result in new or increased generation of waste, litter, or process wastewater beyond the scope of the current AWMP.

2. Requirements for all other CAFOs (see Table 3, p. 16, for an overview)

(a) *Substantial changes.* The permit registrant must submit any proposal to make substantial changes to its AWMP to ODA for approval at least 60 days in advance of the proposed changes. ODA will provide public notice on the proposal as described in S1.H, p. 8. ODA will notify the permit registrant of its final decision concerning the proposed changes after the public notice period ends. The permit registrant must not implement a proposed change until ODA has approved it. The following types of changes to an AWMP are considered substantial:

(i) Addition of new land application areas not previously included in the AWMP, unless the land application area is covered by an existing AWMP that has already been incorporated into an existing NPDES permit and the application of manure, litter, or process wastewater on the newly added land application area is in accordance with that existing NPDES permit.

(ii) Any changes to the field-specific maximum annual rates for land application.

(iii) Any changes to the maximum amounts of nitrogen and phosphorus derived from all sources for each crop.

(iv) Addition of any crop or other uses not included in the AWMP and corresponding field-specific rates of application.

(v) A change in the type of manure system including but not limited to switching from a dry to a liquid manure system, switching from a liquid to a dry manure system, or changing the manure system to accommodate an animal species or type of operation not included in the scope of the current AWMP.

(vi) Any changes that are likely to increase the risk of pollutant transport to surface water or groundwater.

(b) *Non-substantial changes.* The permit registrant must submit any proposal to make non-substantial changes to its AWMP to ODA for approval at least 60 days in advance of the proposed changes unless a different timeframe is allowed by ODA. A proposal for a non-substantial change is not subject to public notice. ODA will notify the permit registrant of its final decision concerning the proposed changes after reviewing the proposal. The permit registrant must not implement a proposed change until ODA has approved it. The following types of changes to an AWMP are considered non-substantial provided they do not result in a substantial modification listed in paragraph (a) above:

(i) An increase in animal numbers greater than 10% of the registrant's maximum allowed animal numbers.

(ii) When facility expansions, production increases, or process modifications will result in new or increased generation of waste, litter, or process wastewater beyond the scope of the current AWMP.

Table 3: Overview of Requirements for Proposed Changes to AWMPs

	Small or Medium CAFO Electing Coverage		All Other CAFOs	
	Substantial Change	***Non-Substantial Change***	***Substantial Change***	***Non-Substantial Change***
Description of proposed change	1. A change in the type of manure system including but not limited to switching from a dry to a liquid manure system, switching from a liquid to a dry manure system, or changing the manure system to accommodate an animal species or type of operation not included in the scope of the current AWMP. 2. An increase in maximum allowed animal numbers such that the operation becomes defined as a large CAFO.	The following are considered non-substantial provided they do not result in a substantial change: 1. An increase in animal numbers greater than 10% of the registrant's maximum allowed animal numbers. 2. When facility expansions, production increases, or process modifications will result in new or increased generation of waste, litter, or process wastewater beyond the scope of the current AWMP.	1. Addition of new land application areas not previously included in the AWMP, unless the land application area is covered by an existing AWMP that has already been incorporated into an existing NPDES permit and the application of manure, litter, or process wastewater on the newly added land application area is in accordance with that existing NPDES permit. 2. Any changes to the field-specific maximum annual rates for land application. 3. Any changes to the maximum amounts of nitrogen and phosphorus derived from all sources for each crop. 4. Addition of any crop or other uses not included in the AWMP and corresponding field-specific rates of application. 5. A change in the type of manure system including but not limited to switching from a dry to a liquid manure system, switching from a liquid to a dry manure system, or changing the manure system to accommodate an animal species or type of operation not included in the scope of the current AWMP. 6. Any changes that are likely to increase the risk of nitrogen and phosphorus transport to surface water or groundwater.	The following are considered non-substantial provided they do not result in a substantial change: 1. An increase in animal numbers greater than 10% of the registrant's maximum allowed animal numbers. 2. When facility expansions, production increases, or process modifications will result in new or increased generation of waste, litter, or process wastewater beyond the scope of the current AWMP.
Timeline to submit proposal to ODA	Submit at least 45 days in advance of proposed change(s).	Submit at least 45 days in advance of proposed change(s) unless a different timeframe allowed by ODA.	Submit at least 60 days in advance of proposed change(s).	Submit at least 60 days in advance of proposed change(s) unless a different timeframe is allowed by ODA.
Public notice process	ODA will public notice as described in S1.H, p. 8.	Not required.	ODA will public notice as described in S1.H, p. 8.	Not required.
ODA approval	ODA will notify the permit registrant of its final decision concerning the proposed change(s) after the public notice period ends.	ODA will notify the permit registrant of its final decision concerning the proposed change(s) after reviewing the proposal.	ODA will notify the permit registrant of its final decision concerning the proposed change(s) after the public notice period ends.	ODA will notify the permit registrant of its final decision concerning the proposed change(s) after reviewing the proposal.

S4. MONITORING, INSPECTION, RECORDKEEPING, AND REPORTING REQUIREMENTS

S4.A. Monitoring Requirements

1. Prohibited Discharges

If a prohibited discharge to surface water or groundwater that is not allowed by S2.B or S2.C, p. 10 occurs, the permit registrant must record the following information and notify ODA within 24 hours (see S4.D, p. 19 for written reporting requirements):

(a) A description and cause of the discharge;
(b) The period of discharge including exact date(s), time(s), and duration of discharge;
(c) An estimate of discharge volume;
(d) Name or location of receiving water;
(e) If a grab sample was taken of the discharge;
(f) Corrective steps taken, if appropriate, to reduce, eliminate, or prevent reoccurrence of the discharge;
(g) For any unauthorized discharge that may have come in contact with a drinking water intake, confirmation that Oregon Emergency Response System (OERS) was notified.

2. Soil, Manure, Litter, and Process Wastewater Monitoring for *Large* CAFOs

The permit registrant with a *large* CAFO must conduct the following sampling and analysis:

Sample Type	Analytical Parameter	Minimum Frequency	Sample Method
• Liquid manure • Process wastewater (if handled separately from liquid manure) • Solid manure	Total nitrogen Total phosphorus	Annually	Sample according to guidance contained in PNW 0533 and PNW 505.
Exported manure, litter, and process wastewater	Total nitrogen Total phosphorus	Annually	Sample according to guidance contained in PNW 0533 and PNW 505.
Soil from land application area(s)	Total nitrogen Total phosphorus Nitrate-nitrogen	Annually on a minimum of 20% of the fields or management units that receive manure, litter or process wastewater applications each year. All fields or management units must be sampled at least once every 5 years.	Sample according to guidance contained in PNW 570-E, EM 8832-E for post-harvest nitrate-nitrogen
Grab sample of effluent discharge from production or land application area	*E. coli*, Nitrate plus Nitrite Nitrogen (NO_3+$N0_2$), Total Phosphorus (P)	Upon occurrence see S2.A.2, p.10.	Grab sample analyzed using test methods in 40 CFR Part 136

3. Soil, Manure, Litter, and Process Wastewater Monitoring for all Other Operations

The permit registrant must conduct the following sampling and analysis:

Sample Type	Analytical Parameter	Minimum Frequency	Sample Method
Soil from land application area(s)	Total nitrogen Total phosphorus	Once every 5 years from all fields or management units where manure, litter, or	Sample according to guidance contained in PNW 570-E, EM

		process wastewater is applied.	8832-E.
Grab sample of effluent discharge from production or land application area	*E. coli*, Nitrate plus Nitrite Nitrogen (NO_3+NO_2), Total Phosphorus (P)	Upon occurance see S2.A.2, p.10.	Grab Sample analyzed using test methods in 40 CFR Part 136

S4.B. Inspection Requirements

1. The permit registrant must conduct the following inspections:

Item	Large CAFO	All Other Operations
(a) Stormwater diversion devices, runoff diversion structures, animal waste storage structures, and devices channeling contaminated stormwater to wastewater and manure storage and containment structures	Weekly and record results	At least once every six months
(b) Water lines, including drinking water or cooling water lines	Daily and record results	At least once every six months
(c) Equipment used for land application of manure, litter, or process wastewater	Daily when equipment is in use and record results	At least once every six months when equipment is in use
(d) Liquid impoundments for manure and process wastewater	Weekly and record depth of manure and process wastewater according to depth marker required by S2.E.3, p. 11	At least once every six months

2. The permit registrant must correct any deficiencies found as a result of these inspections as soon as possible. The permit registrant with a *large* CAFO must record any actions taken to correct these deficiencies and, if deficiencies are not corrected within 30 days, provide an explanation of the factors preventing immediate correction.

S4.C. Recordkeeping and Availability Requirements

1. The permit registrant must maintain all information required by this permit at the facility for at least five (5) years and make this information available to ODA upon request.

2. Upon obtaining permit coverage, the permit registrant must record the following information:

Item or Parameter	Large CAFO	All Other Operations
(a) Date, amount, and nutrient loading of manure, litter, or process wastewater applied to each field.	Required	Required
(b) Weather conditions at the time of application and 24 hours before and after application.	Required	Not required
(c) Total amount of nitrogen and phosphorus actually applied annually to each field, including documentation of calculations of the total amount applied.	Required	Required

Item or Parameter	Large CAFO	All Other Operations
(d) Total amount of manure or wastewater transferred or exported to other persons.	Required. Also include: (i) Date and amount of each transfer or export (ii) Name and address of each recipient (iii) Copy of the manure nutrient analysis conducted provided to the recipient (See S2.K.3, p. 12)	Required
(e) Description of actions taken to correct deficiencies discovered during inspections.	Required (See S4.B.2, p. 18)	Not required

S4.D. Reporting Requirements

1. Reporting to ODA and Oregon Emergency Response System (OERS)
   (a) If a discharge to surface water or groundwater occurs that is not allowed by S2.B and S2.C, p. 10, the permit registrant must notify ODA within 24 hours of the discharge. The permit registrant must submit a written report within five (5) days to ODA. The information to be submitted is listed in the monitoring requirements (See S4.A, p. 17) of this permit.
   (b) The permit registrant must notify ODA within 24 hours of becoming aware of any significant physical failure at any time of treatment works required under this permit.
   (c) The permit registrant must notify ODA within 24 hours of any permit noncompliance that may endanger health or the environment as described in G13.6, p. 23.
   (d) In addition to complying with [1.(c)] above, the permit registrant must notify Oregon Emergency Response System (OERS) of any unauthorized discharge that may come in contact with a surface water or groundwater drinking water system intake within 24 hours. Notification must be made by calling OERS at 1-800-452-0311

2. Reporting of Monitoring Results of a prohibited effluent discharge
   (a) The permit registrant must submit monitoring information for an effluent grab sample no later than one month from the date the sample was taken unless a different schedule is established by an administrative order as described in S4.E, p. 20.
   (b) Reporting of monitoring information must include:
      (i) The date, exact place, and time of sampling or measurements;
      (ii) The individual(s) who performed the sampling or measurements;
      (iii) The date(s) analyses were performed;
      (iv) The individual(s) who performed the analyses;
      (v) The analytical techniques or methods used; and
      (vi) The results of such analyses that includes the sample result and quantitation limit of the analysis.

3. Annual Report
   (a) The permit registrant must submit an annual report to ODA by March 15 of each year. The annual report must include the following for the previous calendar year :
      (i) Maximum number and type of animals approved by ODA in the permittee's *Notice of Registration*, whether in open confinement or housed under roof (for example, beef cattle, broilers, layers, swine weighing 55 pounds or more, swine weighing less than 55 pounds, mature dairy cows, dairy heifers, veal calves, sheep and lambs, horses, ducks, turkeys, other).
      (ii) Actual number of animals by type averaged over the year.
      (iii) Estimated amount of total manure, bedding, litter, process wastewater, and other material that comes in contact with manure generated (tons, gallons, cubic feet, or cubic yards).
      (iv) Estimated amount of total manure, bedding, litter, process wastewater, and other material that comes in contact with manure transferred to other persons by the permittee (tons, gallons, cubic feet, or cubic yards).
      (v) Estimated amount of manure, bedding, litter, process wastewater, and other material that comes in contact with manure applied to land by the permittee (tons, gallons, cubic feet, or cubic yards).
      (vi) Total number of acres for land application covered by the AWMP developed in accordance with

the terms of this permit.

(vii) Total number of acres under control of the permittee that were used for land application of manure, litter, and process wastewater in the previous 12 months.

(viii) Summary of all manure, litter, and process wastewater discharges from the production area that have occurred, including date, time and approximate volume.

(ix) A statement indicating whether the AWMP was developed or approved by a certified waste management planner.

(x) Any Concentrated Animal Feeding Operation that discharges to surface waters must also report the following items (xi) through (xvi). (40 CFR 122.42(e)(4)(viii)

(xi) Actual crop(s) planted and actual yield(s) for each field.

(xii) Actual nitrogen and phosphorus content of the manure, litter, and process wastewater.

(xiii) Data used and results of calculations based on protocol in the ODA-approved AWMP.

(xiv) Amount of manure, litter, and process wastewater applied to each field during the previous 12 months.

(xv) Results of soil testing for nitrogen and phosphorus if testing was performed.

(xvi) Amount of any supplemental fertilizer applied.

(b) The annual report must be signed and certified by the permittee or permittee's authorized representative with the following statement: "I certify, under penalty of law, that this document and all attachments were prepared under my direct supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

S4.E. Additional Monitoring

1. ODA may establish specific monitoring requirements in addition to those contained in this permit by administrative order. An administrative order is an agency action expressed in writing directed to a named person or named persons (ORS 183.310).

2. If a permittee experiences two or more discharges within a 24-month period that are not associated with a 25-year, 24-hour or greater rainfall event, ODA may require surface water and/or groundwater quality monitoring or transfer the permittee to an individual permit. Monitoring for the following parameters may be required: bacteria, total suspended solids, total kjeldahl nitrogen, biochemical oxygen demand, and other nutrient indicators. If ODA waives the additional monitoring requirements because such monitoring would be impracticable or not likely to produce useful information, ODA will set out the basis for the decision in writing and make the decision available to interested persons.

GENERAL CONDITIONS

The general conditions in this schedule apply only to the extent they do not conflict with the requirements contained in special conditions S1 through S4. If the permit requirements in special conditions S1 through S4 conflict with these general conditions, the permit requirements in special conditions S1 through S4 will control.

G1. Compliance with other laws and statutes
Nothing in the permit will be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

G2. Duty to comply [40 CFR § 122.41(a)]
The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

1. The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.
2. The Clean Water Act provides that any person who violates section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed $25,000 per day for each violation. The Clean Water Act provides that any person who *negligently* violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than 2 years, or both. Any person who *knowingly* violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both. Any person who knowingly violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.
3. Any person may be assessed an administrative penalty by the Administrator for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000.

G3. Duty to reapply [40 CFR § 122.41(b)]
If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit.

G4. Need to halt or reduce activity not a defense [40 CFR § 122.41(c)]
It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

G5. Duty to mitigate [40 CFR § 122.41(d)]
The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

G6. Proper operation and maintenance [40 CFR § 122.41(e)]
The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

G7. Permit actions
1. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition. [40 CFR § 122.41(f)]
2. After notice, registration under this permit may be modified or revoked as it applies to any person for cause as follows:
   (a) Violation of any terms or conditions of the permit,
   (b) Failure of the permittee to disclose fully all relevant facts, or misrepresentations of any relevant facts by the permittee during the permit issuance process and during the life of the permit;
   (c) Failure to pay permit fees required by Oregon Administrative Rule when due;
   (d) Information indicating that the permitted operation poses a threat to human health or welfare;
   (e) A change in ownership or control of the operation, or
   (f) Other causes listed in 40 CFR § 122.62 and 122.63.
3. Modification or revocation of coverage under this permit as it applies to any person may be initiated by ODA.
4. Issuance of coverage under an individual permit may be initiated by ODA in accordance with S1.A.2.

G8. Property rights [40 CFR § 122.41(g)]
This permit does not convey any property rights of any sort, or any exclusive privilege.

G9. Duty to provide information [40 CFR § 122.41(h)]
The permittee shall furnish to the director, within a reasonable time, any information which the director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish to the director, upon request, copies of records required to be kept by this permit.

G10. Inspection and entry [40 CFR § 122.41(i)]
The permittee shall allow the director or an agency authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:
1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act or state law, any substances or parameters at any location.

G11. Monitoring and records [40 CFR § 122.41(j)]
1. Samples and measurements taken for the purpose of monitoring must be representative of the monitored activity.
2. Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which must be retained for a period of at least five years (or longer as required by 40 CFR Part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a

period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the director at any time.

3. Records of monitoring information must include:
   (a) The date, exact place, and time of sampling or measurements;
   (b) The individual(s) who performed the sampling or measurements;
   (c) The date(s) analyses were performed;
   (d) The individual(s) who performed the analyses;
   (e) The analytical techniques or methods used; and
   (f) The results of such analyses.
4. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136 unless another method is required under 40 CFR subchapters N or O.
5. The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

G12. Signatory requirement [40 CFR § 122.21(k)]

1. All applications, reports, or information submitted to the director shall be signed and certified. (See § 122.22)
2. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

G13. Additional reporting requirements [40 CFR § 122.41(l)]

1. *Planned changes.* The permittee shall give notice to the director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:
   (a) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in § 122.29(b); or
   (b) The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under § 122.42(a)(1).
   (c) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan;
2. *Anticipated noncompliance.* The permittee shall give advance notice to the director of any planned changes in the permitted facility or activity that may result in noncompliance with permit requirements.
3. *Transfers.* This permit is not transferable to any person except after notice to the director. The director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act. (See § 122.61; in some cases, modification or revocation and reissuance is mandatory.)
4. *Monitoring reports.* Monitoring results must be reported at the intervals specified elsewhere in this permit.
   (a) Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by the director for reporting results of monitoring of sludge use or disposal practices.
   (b) If the permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136, or another method required for an industry-specific waste stream under 40 CFR subchapters N or O, the results of such monitoring must be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the director.
   (c) Calculations for all limitations that require averaging of measurements must utilize an arithmetic mean unless otherwise specified by the director in the permit.
5. *Compliance schedules.* Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date.
6. *Twenty-four hour reporting.*
   (a) The permittee shall report any noncompliance that may endanger health or the environment. Any information must be provided orally within 24 hours from the time the permittee becomes aware of the

circumstances. A written submission must also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission must contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

(b) The following must be included as information that must be reported within 24 hours under this paragraph.
   (i) Any unanticipated bypass that exceeds any effluent limitation in the permit. (See § 122.41(g) or G14, p. 24.)
   (ii) Any upset which exceeds any effluent limitation in the permit. (See § 122.41(n) or G15, p. 24.)
   (iii) Violation of a maximum daily discharge limitation for any of the pollutants listed by the director in the permit to be reported within 24 hours. (See § 122.44(g).)

(c) The director may waive the written report on a case-by-case basis for reports under G13.6(b) of this section if the oral report has been received within 24 hours.

7. *Other noncompliance.* The permittee shall report all instances of noncompliance not reported under G13.4, 5, and 6 of this section, at the time monitoring reports are submitted. The reports must contain the information listed in G13.6 of this section.
8. *Other information.* Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the director, it shall promptly submit such facts or information.

G14. Bypass [40 CFR § 122.41(m)]

1. *Definitions.*
   (a) *Bypass* means the intentional diversion of waste streams from any portion of a treatment facility.
   (b) *Severe property damage* means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
2. *Bypass not exceeding limitations.* The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of G14.3 and 4 of this section.
3. *Notice*
   (a) *Anticipated bypass.* If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.
   (b) *Unanticipated bypass.* The permittee shall submit notice of an unanticipated bypass as required in G13.6 of this section (24-hour notice).
4. *Prohibition of bypass.*
   (a) Bypass is prohibited, and the director may take enforcement action against a permittee for bypass, unless:
      (i) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
      (ii) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
      (iii) The permittee submitted notices as required under G14.3 of this section.
   (b) The director may approve an anticipated bypass, after considering its adverse effects, if the director determines that it will meet the three conditions listed above in G14.4(a) of this section.

G15. Upset [40 CFR § 122.41(n)]

1. *Definition. Upset* means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
2. *Effect of an upset.* An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of G15.3 of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

3. *Conditions necessary for a demonstration of upset.* A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
   (a) An upset occurred and that the permittee can identify the cause(s) of the upset;
   (b) The permitted facility was at the time being properly operated; and
   (c) The permittee submitted notice of the upset as required in G13.6(b)(ii) of this section (24 hour notice).
   (d) The permittee complied with any remedial measures required under G5 of this section.
4. *Burden of proof.* In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

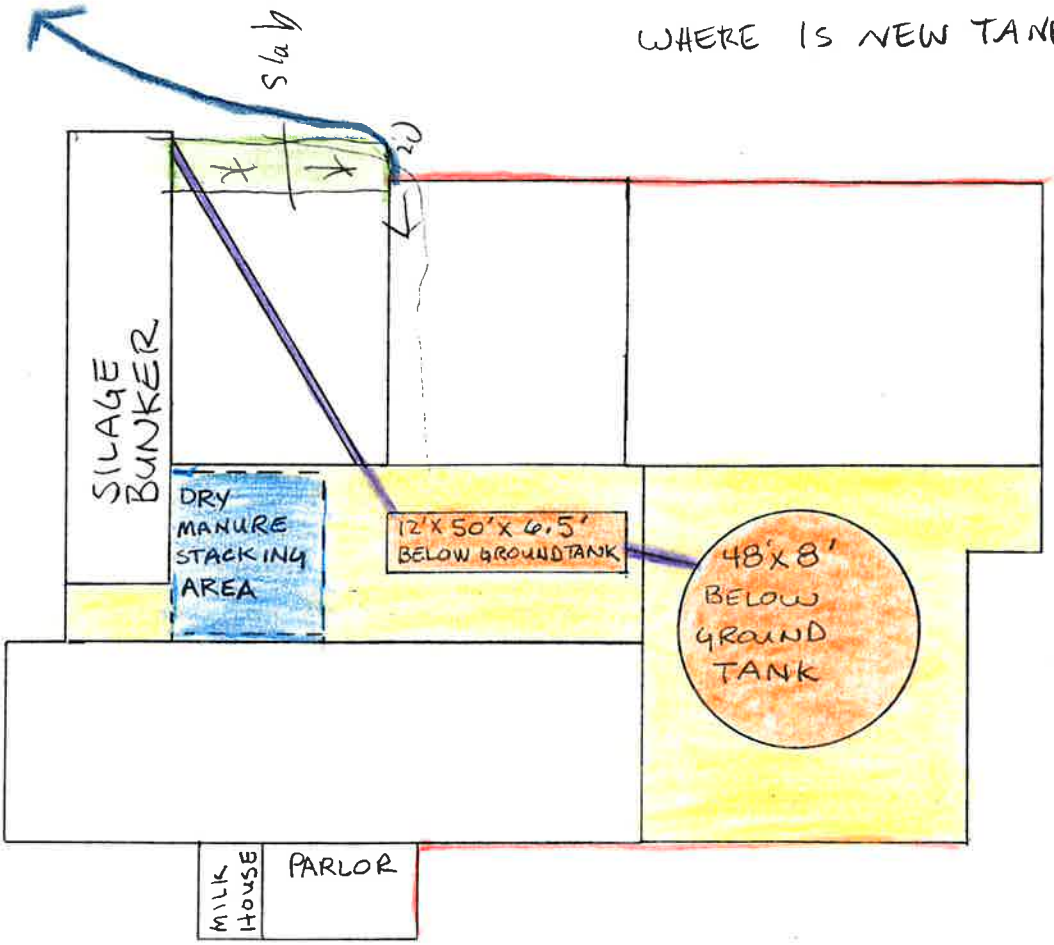
COMPUTATION SHEET
SCS-ENG-503A Rev. 9-80

STATE: OREGON
PROJECT: MOSS CREEK DAIRY - FILOSI
KWP 104-08-98

FARMSTEAD LAYOUT

MAP LEGEND

Existing Liquid Waste Storage Tank
Roof
Solid Manure Storage Area
Manure Transfer Pipe
Gutters
Gutter Outlet
Unroofed Manure Accumulation Area



SCALE 1" = 40'