PROJECT DESCRIPTION

Victor Dairy is planning to add an underground pipeline that will cross the Wilson River so that wastewater from the dairy can be pumped to additional lands on the south side of the river. The pipeline will consist of a 110 mm, approximately 4 inch diameter, high density polyethylene pipe that will be buried underground and under the Wilson River.

GENERAL SPECIFICATIONS

The owner is responsible for obtaining and complying with all permits related to the construction and operation of this project.

No representation as to existence or non-existence of utilities, public or private is made. It is the responsibility of the contractor to comply with provisions of ORS 757.541 and 757.571 and to determine the location of utilities (1-800-332-2344 or 811). The contractor will be liable for any damage resulting from disruption of service caused by construction activities.

The contractor shall be responsible for on site construction activities and safety of all personnel during construction. These drawings and specifications are not intended to provide means or methods of construction.

All planned facilities will be constructed in accordance with these drawings and the specifications therein.

LOCATION MAP

Section 19, T1S, R9W from the Willamette Meridian

INDEX OF DRAWINGS

REGISTERED PROFESSIONAL ENGINEER
12,954
OREGON
JULY 26, 1985
BRUCE D. WILSON
SIGNED: 7/2020

DRAFT

EXPIRATION DATE: 6/30/2020

Victor Dairy Wastewater Transfer Pipeline
COVER PAGE

Tillamook County, Oregon

H & R Engineering LLC
KEIZER, OREGON

DESIGNED BY: B. Wilson
DRAWN BY: B. Wilson
DRAWING NO.: VD01
February 2020
Sheet 1 of 4

SITE PLAN

100 0 100

SCALE IN FEET

REGISTERED PROFESSIONAL ENGINEER
OREGON
JULY 26, 1985
BRUCE D. WILSON

DRAFT

SIGNED: //

EXPIRATION DATE: 6/30/2020

Victor Dairy Wastewater Transfer Pipeline
SITE PLAN

Tillamook County, Oregon

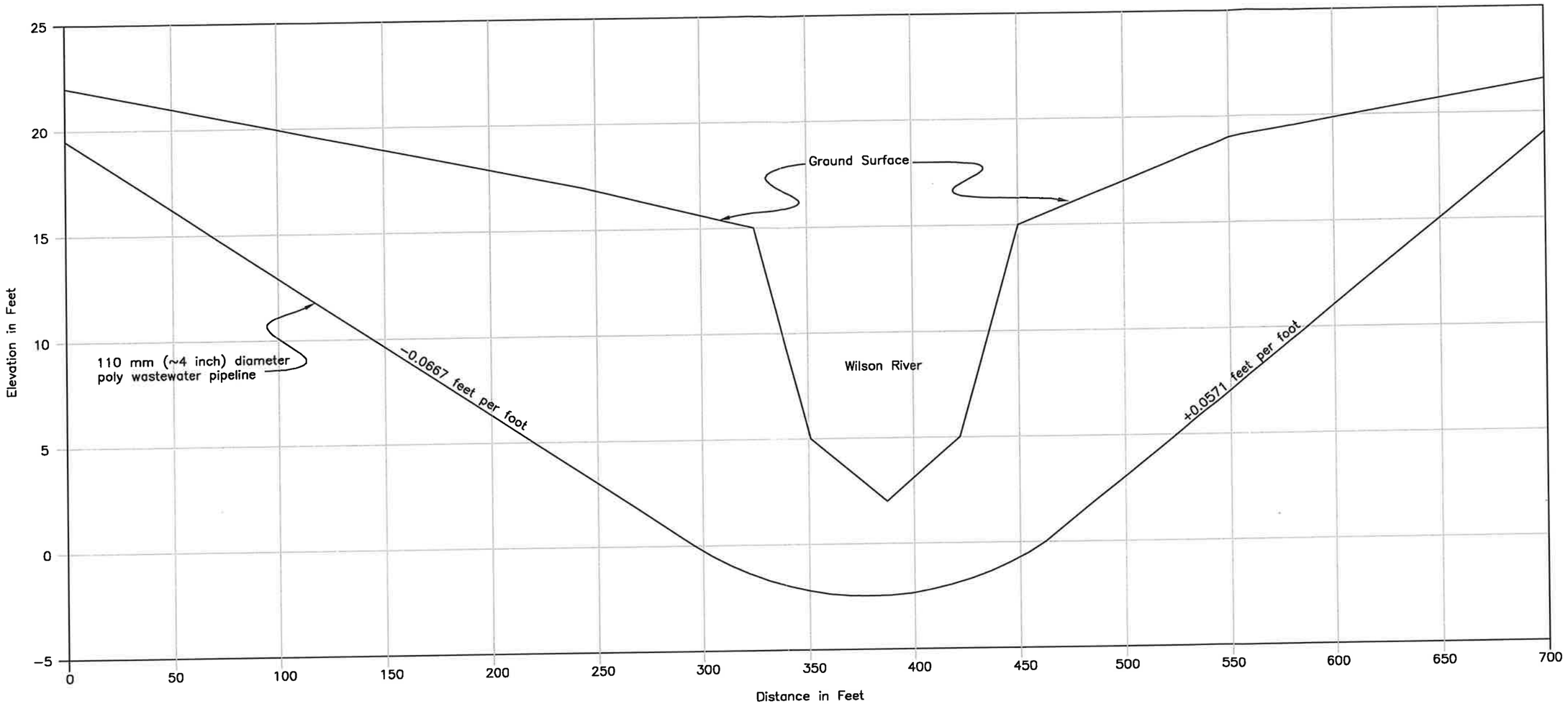
H & R Engineering LLC

KEIZER, OREGON

DESIGNED BY: B. Wilson
DRAWN BY: B. Wilson

DRAWING NO. 1802

February2020



PROFILE ON CENTERLINE OF WASTEWATER PIPELINE

REGISTERED PROFESSIONAL ENGINEER
12,954
OREGON
JULY 26, 1985
BRUCE D. WILSON
DRAFT
SIGNED: //2020
EXPIRATION DATE: 6/30/2020

Victor Dairy Wastewater Pipeline

PROFILE ON CENTERLINE OF WASTEWATER PIPELINE

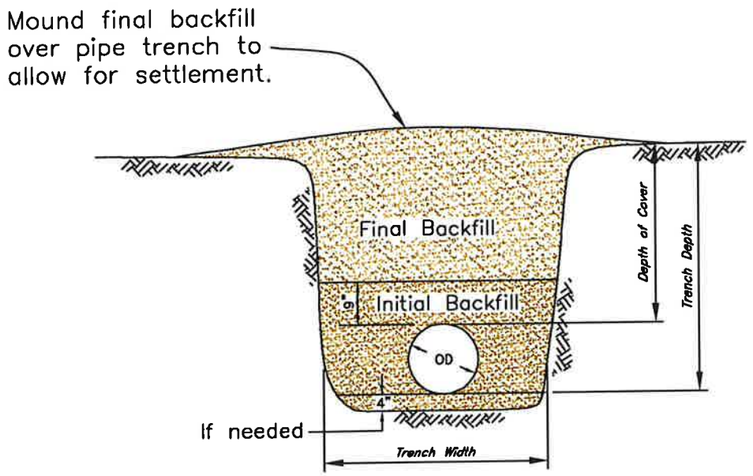
Tillamook County, Oregon

H & R Engineering LLC
KEIZER, OREGON

DESIGNED BY: B. Wilson
DRAWN BY: B. Wilson

DRAWING NO.: VD03

February 2020
Sheet 3 of 4



PIPELINE TRENCH DETAILS

(Not to Scale)

CONSTRUCTION NOTES

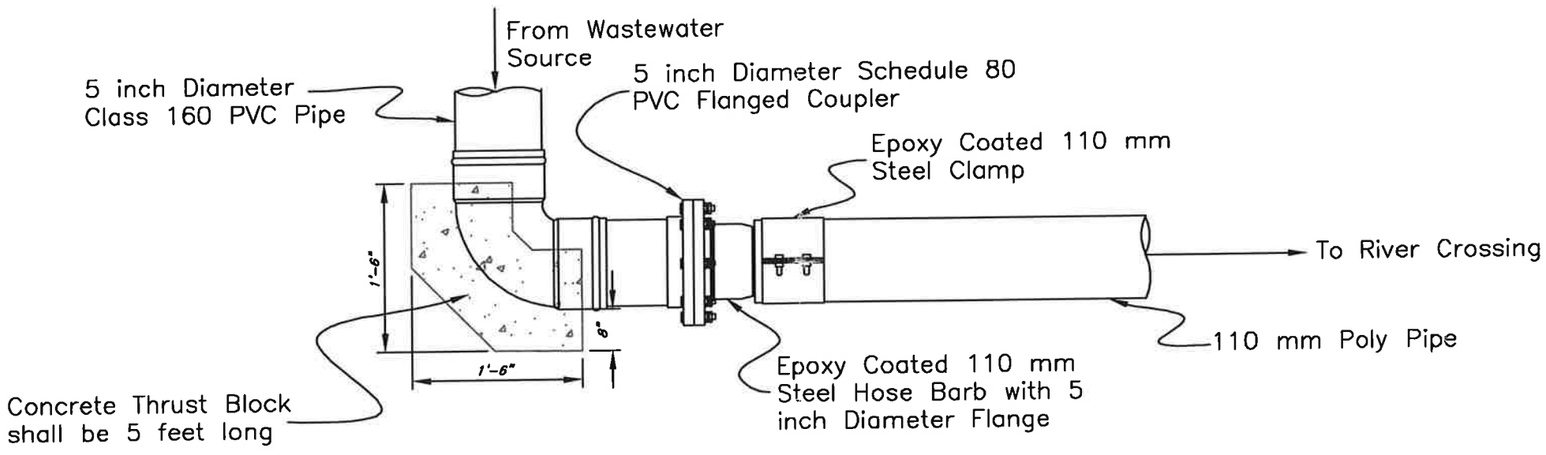
Initial backfill material for the pipe trench shall consist of native soil or sand placed in a manner to provide a homogeneous fill free of rocks larger than 1 inch in diameter.

Final backfill material for the pipe trench shall consist of native soil or sand placed in a manner to provide a homogenious fill free of rocks and clods larger than 6 inches in diameter.

Minimum pipe trench dimensions shall be as follows:

Pipe OD	Trench Width	Trench Depth	Depth of Cover
4 & 5 in	12 in	30 in	24 in

If the native material in the bottom of the trench may damage the pipe, over excavate the trench bottom by 4 inches and backfill with initial backfill material to grade before placing pipe.



PIPELINE CONNECTION DETAILS

(Not to Scale)

REGISTERED PROFESSIONAL ENGINEER
12,954
OREGON
JULY 26, 1985
BRUCE D. WILSON
SIGNED: /2020

DRAFT

EXPIRATION DATE: 6/30/2020

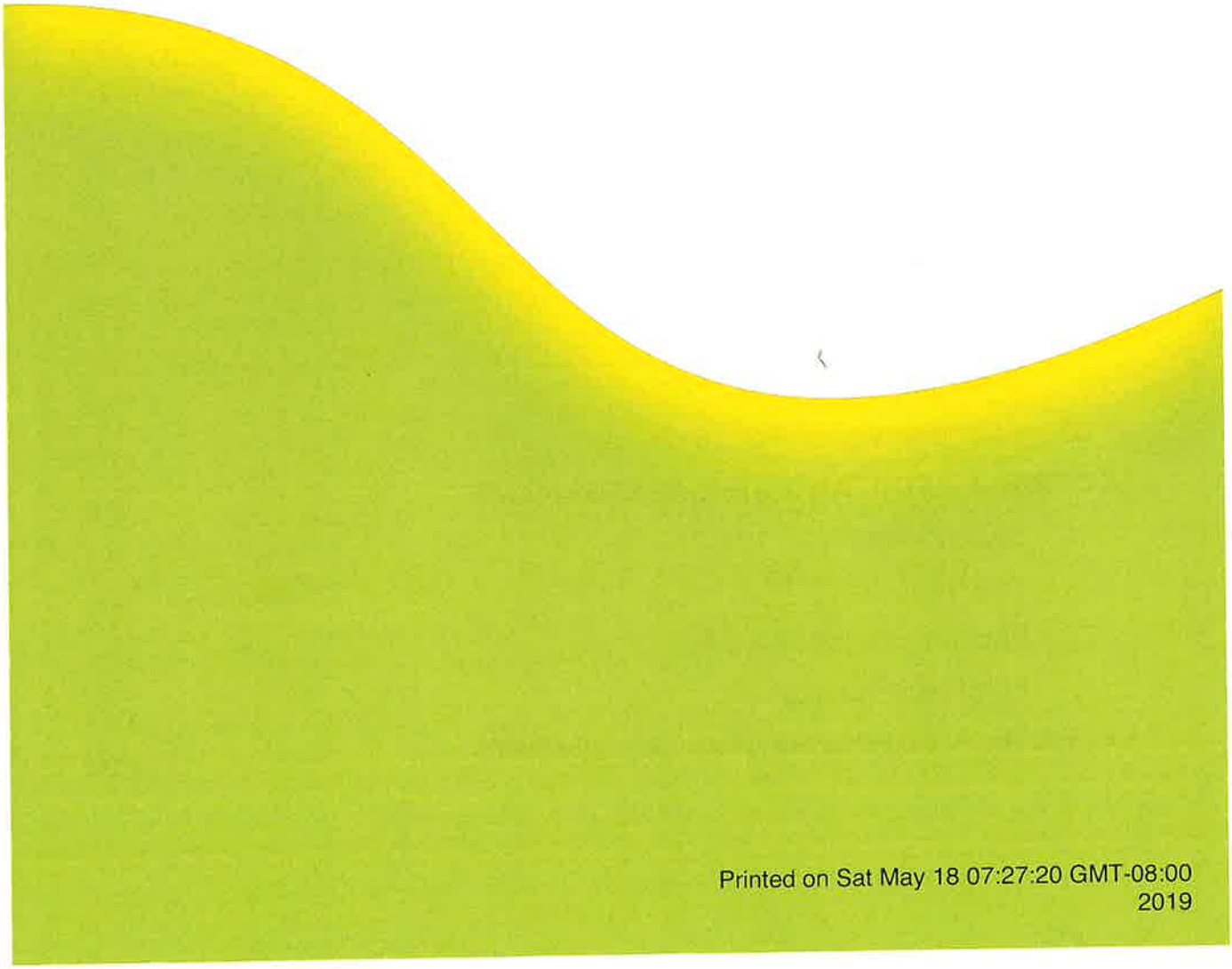
Victor Dairy Wastewater Transfer Pipeline
PIPELINE TRENCHING AND CONNECTION DETAILS
Tillamook County, Oregon

H & R Engineering, LLC
KEIZER, OREGON

DESIGNED BY: B. Wilson
DRAWN BY: B. Wilson
DRAWING NO.: VD04
February 2020
Sheet 4 of 4

Nutrient Management Plan

For Victor Dairy



Printed on Sat May 18 07:27:20 GMT-08:00 2019

Table of Contents

GENERAL INFORMATION

2018 Operation Information for Victor Dairy

Calendar Year: 2018 **Reporting** January 1 through December 31, 2018

Name:	Allen, Chad		
Business	Victor Dairy		
Mailing	2805 Old Latimer Road, Tillamook, OR 97141		
Facility	2805 Old Latimer Road, Tillamook, OR 97141	**County:**	Tillamook
Telephone	(503)801-1097	**Cell Phone**	
E-mail	victordairy@centurylink.net		

Actual number of animals by type at the CAFO averaged over the year [S4.D.2(a)/S4.D.2(a)(ii) of the permit].

	Permitted	Actual
Milker - Holstein	365	500
Milker - Dry	85	135
Dairy Heifers	110	0
Calf	110	150
Other:		
Total Animals:	670	785

Estimated Manure Generated -	454,513 CF
Estimated Litter Generated -	0 CF
Estimated Process Water Generated -	219 CF
Estimated Manure Exported -	7,700 CF
Estimated Litter Exported -	0 CF
Estimated Process Water Exported -	168,370 CF
Estimated Manure Applied to Land -	287,479 CF
Acres of Land for Land Application Covered by AWMP -	342.8 AC
Acres of Land Under Operator Control Used for Manure Applications -	269.2 AC

GENERAL INFORMATION

Background And Site Information

Animal Feeding Operation: Medium Confined CAFO
Type & Size: Dairy – 785 animals
Latitude/Longitude: N45.4767o, W123.8356o
Victor Dairy is located just south of Tillamook Creamery on 2805 Old Latimer Road, Tillamook, OR. Victor Dairy is currently permitted for 670 animals consisting of 365 milk cows, 85 dry cows, 110 heifers, and 110 calves. The dairy wishes to increase the animal number to 785 total animals consisting of 500 milkers, 135 dry cows, and 150 calves. This reflects that all calves over 6 months are shipped to Hermiston and returned to the Dairy prior to calving. An application to modify animals numbers is included in the Supplemental section of the NMP.

This plan was written based on 635 mature and 150 young animals and land base described herein.

Milking cows are grazed for half the year while dry cows and heifers are grazed about 215 days each year. Grazing is based on weather conditions, livestock health, economic conditions, and excessive forage production during the year. Livestock mortality service is provided by the Tillamook County Creamery Association.

The operation consists of two adjacent facilities which will be used, in conjunction with one another to best manage the cows housing needs at various growth stages and the fields at those facilities for maximizing forage composition and yield. The Yellow Barn facility houses the milking operation and calves with the dry cows and heifers housed at the Red Barn facility. There is additional land base at Goodspeed and Sutton Creek Roads. The Goodspeed Road is used for manure application, forage harvest, and has some animal housing (Wetzel) which is not used by the dairy at this time. The Sutton Creek Road acreage is used for manure application and forage production only with no animal housing

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.

Yellow Barn (T3 – 57.4 acre)
This facility is the main milking operation and is comprised of 57.4 tillable acres. The cows are housed in free stall barns, the calves in hutches, and the springing heifers in a bedded pack barn. The barns are scraped daily to underground tanks from which manure is removed 1 time per day by the Port of Tillamook Digester (POTD) tanker truck. The POTD truck deposits returned manure into any of the liquid storage tanks at any one of the three facilities until applied to the fields. The solids are removed and retained by the digester.

Red Barn (T338 – 52.3 acre)
This facility is used for heifers and is comprised of 52.3 tillable acres. The heifers are housed in free stall barns that are scraped daily to underground tanks from which manure is removed 1 times per day by the Port of Tillamook Digester (POTD) tanker truck. The POTD truck deposits returned manure into any of the liquid storage tanks at any one of the three facilities until applied to the fields. The solids are removed and retained by the digester.

Goodspeed Road (T616 - 85.0 acre)
This facility (Wetzel) is currently used for manure application and forage production. No dairy animals are located at this site. The facility has an old parlor and freestall barn with solids storage and a below ground scrape tank that is not used by the dairy at this time.

GENERAL INFORMATION

An above ground liquid tank is used by the dairy to stockpile manure for later field application.

Sutton Creek (T - 35.3 acre)

This facility is used for manure application and forage harvest only and is comprised of 35.3 tillable acres.

Aufdermaurer Fields (T - 51.4 acres)

This facility is used for manure application only and is composed of 51.4 tillable acres.

Manure Handling - All Facilties

Stored liquid manure is applied to fields by various methods including a big gun traveler, a dragline, or a tank wagon at agronomic rates.

Solid manure generated by the facility is mainly from calf hutches or the maternity pen. This manure will either be stored onsite for later field application or transported to one of the other facilities for field application based on the time of year and agronomic need.

The combined liquid manure storage for all three facilities is estimated to be 13,392,678 gallons and provide 92 days of storage. The total planned roofed solid manure storage is 33,150 cubic feet and provides 365 days of storage.

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.

Phosphorus Index

The soil concentration of phosphorus ranges from low to medium in the Victor 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 liquids and 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 hay and pasture land fields. Supplemental nutrient applications to the hay and pasture land fields should be based on soil tests and fertilizer guides to prevent excess soil nutrient concentrations.

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 Victor 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 non-irrigated crop yield data from the Tillamook County 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 well managed fields.

Traveling big gun irrigation systems are used to irrigate and apply wastewater containing manure and other organics produced from the Victor Dairy to the crop land fields. 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 calibrated and well managed to prevent excess percolation, surface runoff, wind drift and evaporation losses.

Other types of irrigation systems will be used to irrigate the crops that 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 in the nutrient management specification.

GENERAL INFORMATION

Tractor pulled tank wagons are used to apply wastewater containing manure and other organics produced from Victor Dairy. Tractor pulled tank wagons must be calibrated and well managed to prevent excess applications of nutrients from solids containing manure.

Tractor pulled solids spreaders are used to apply solids containing manure and other organics produced from Victor Dairy. Tractor pulled solids spreaders must be calibrated and well managed to prevent excess applications of nutrients from solids containing manure.

Animal Mortality Management

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

Emergency Response Plan

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

Implement the following first containment steps:

Stop all other activities to address the spill.
Stop the flow. For example, use skid loader or tractor with blade to contain or divert spill or leak.
Call for help and excavator if needed.
Complete the clean-up and repair the necessary components.
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:

Stop all other activities to address the spill and stop the flow.
Call for help if needed.
If the spill posed a hazard to local traffic, call for local traffic control assistance and clear the road

and roadside of spilled material.
Contain the spill or runoff from entering surface waters using straw bales, saw dust, soil or other

appropriate materials.
If flow is coming from a tile, plug the tile with a tile plug immediately.
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 Department of Agriculture Natural Resources Division TTD 635 Capitol St., N.E. Salem, OR 97301-2532	(503) 986-4699 (503) 986-4762
Oregon Emergency Response (System OERS)	(800) 452-0311

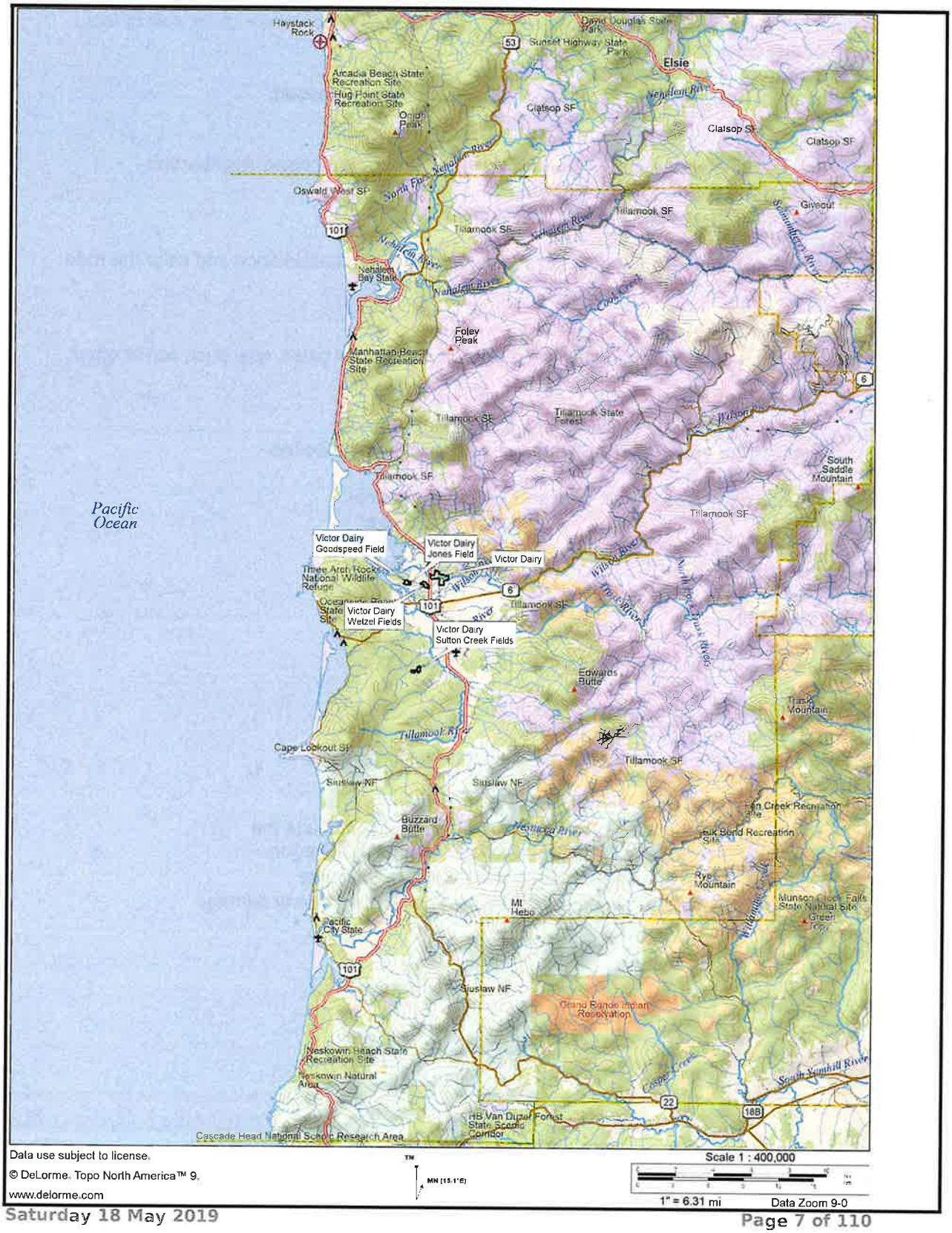
Be prepared to provide the following information:

Your name and contact information.
Farm location (driving directions) and other pertinent information.
Description of emergency.
Estimate of the amounts, area covered, and distance traveled.
Whether manure has reached surface waters or major field drains. Include the name of the surface water source that manure reached. Contact the Oregon Emergency Response System if manure entered a drinking water source.
Whether there is any obvious damage: employee injury, fish kill, or property damage.
If a grab sample of the discharge was taken.
Current status of containment efforts.

GENERAL INFORMATION

Location Maps for Victor Dairy

Location Map #2



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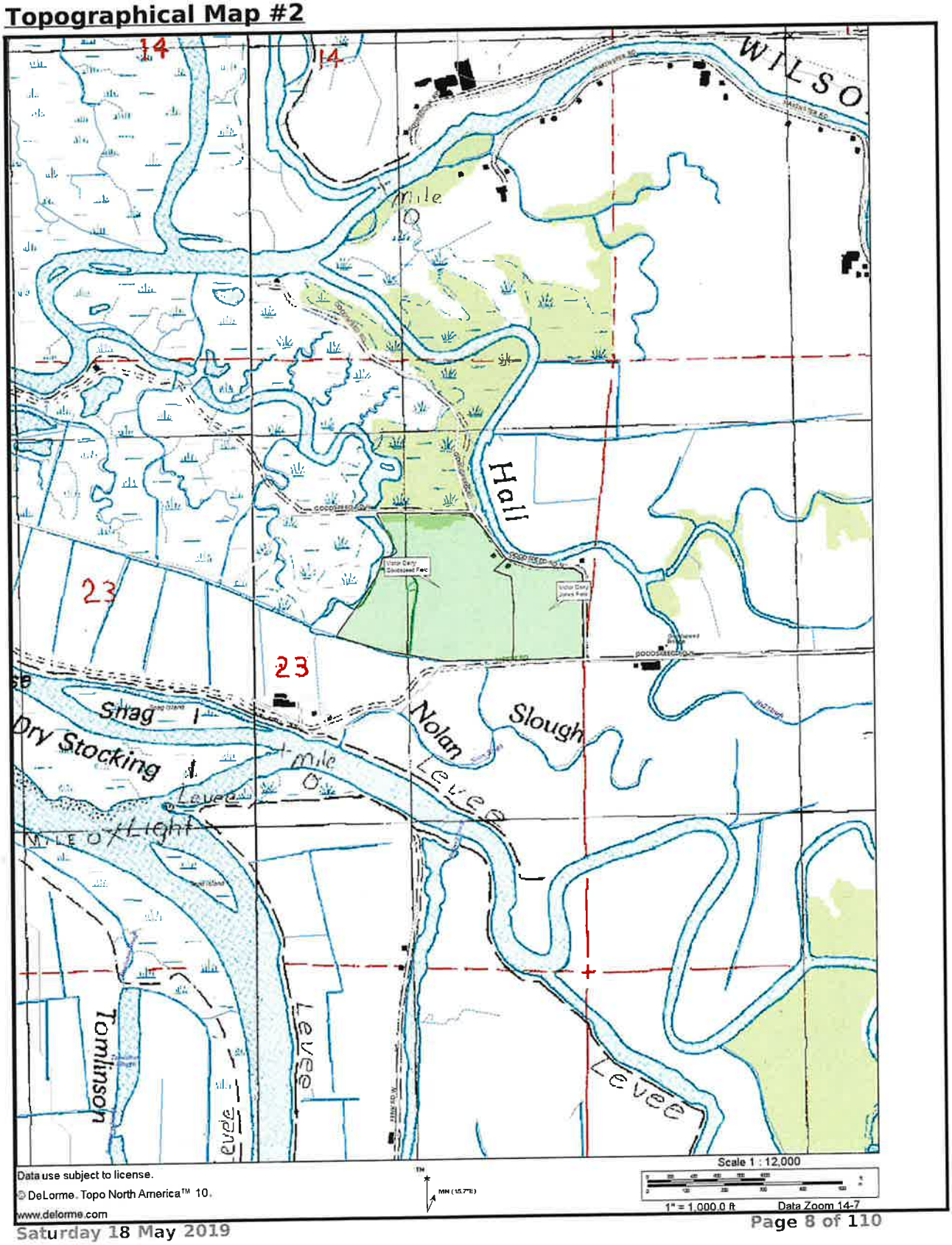
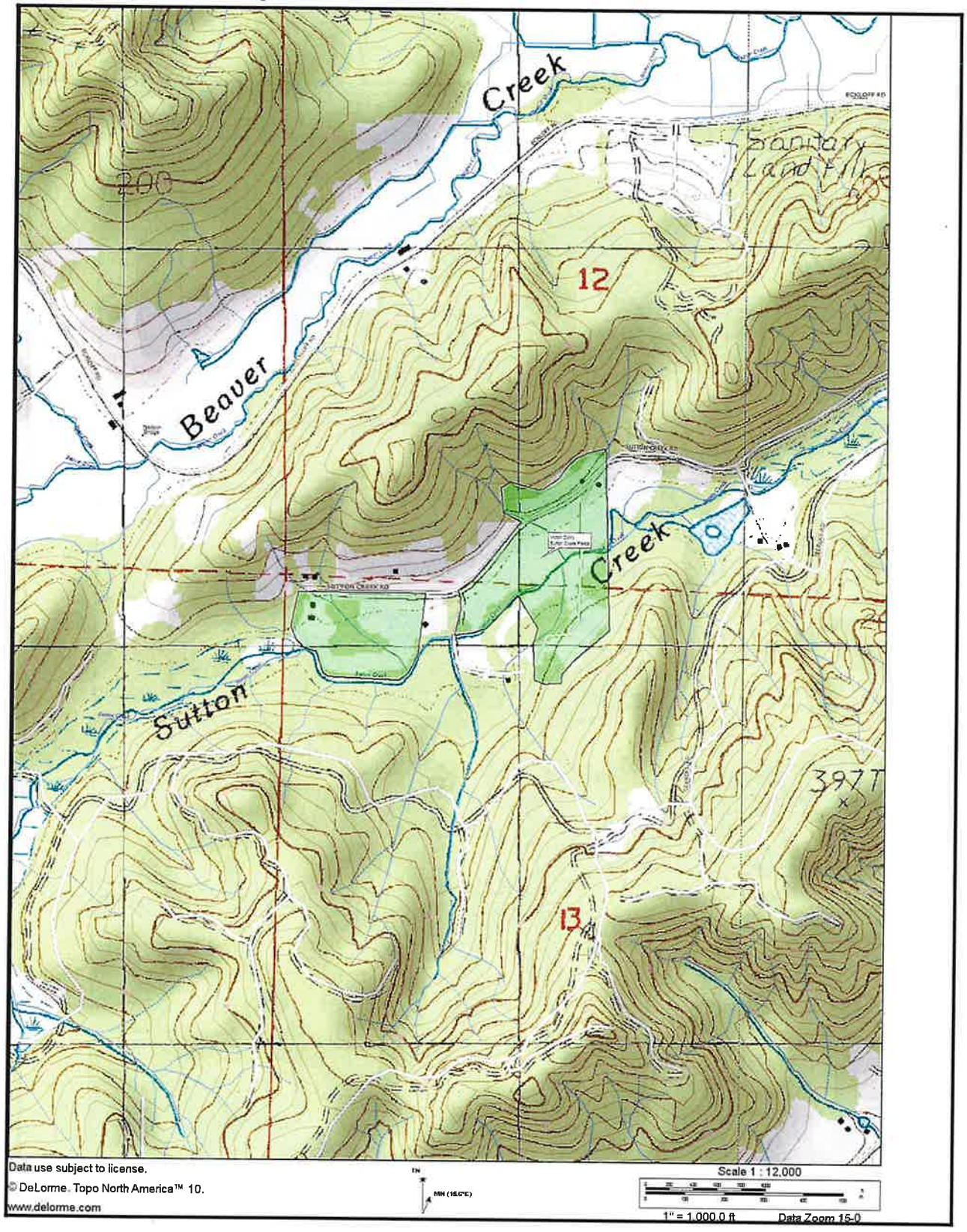
Topographical Maps for Victor Dairy

Topographical Map #2

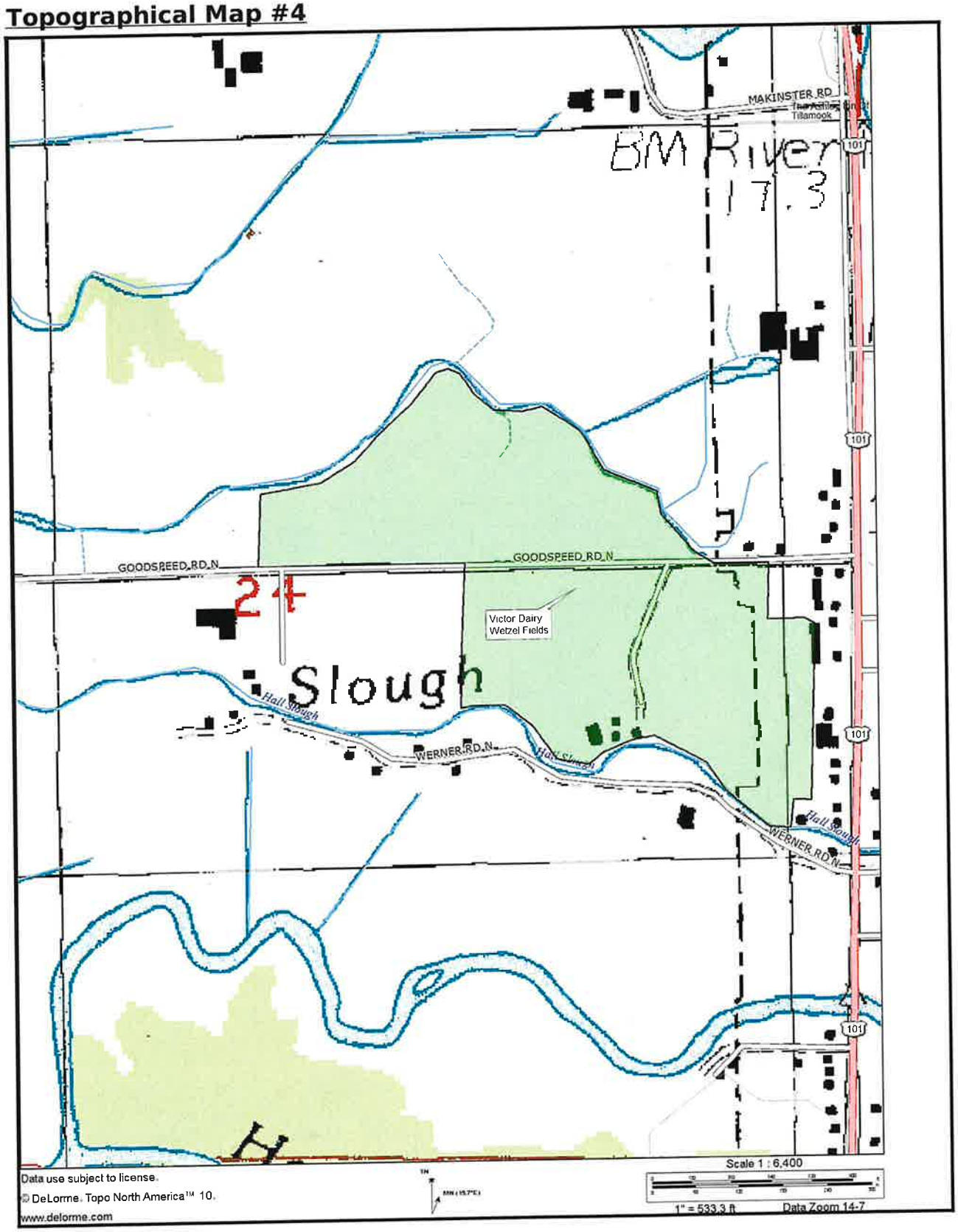


Topographical Map #3



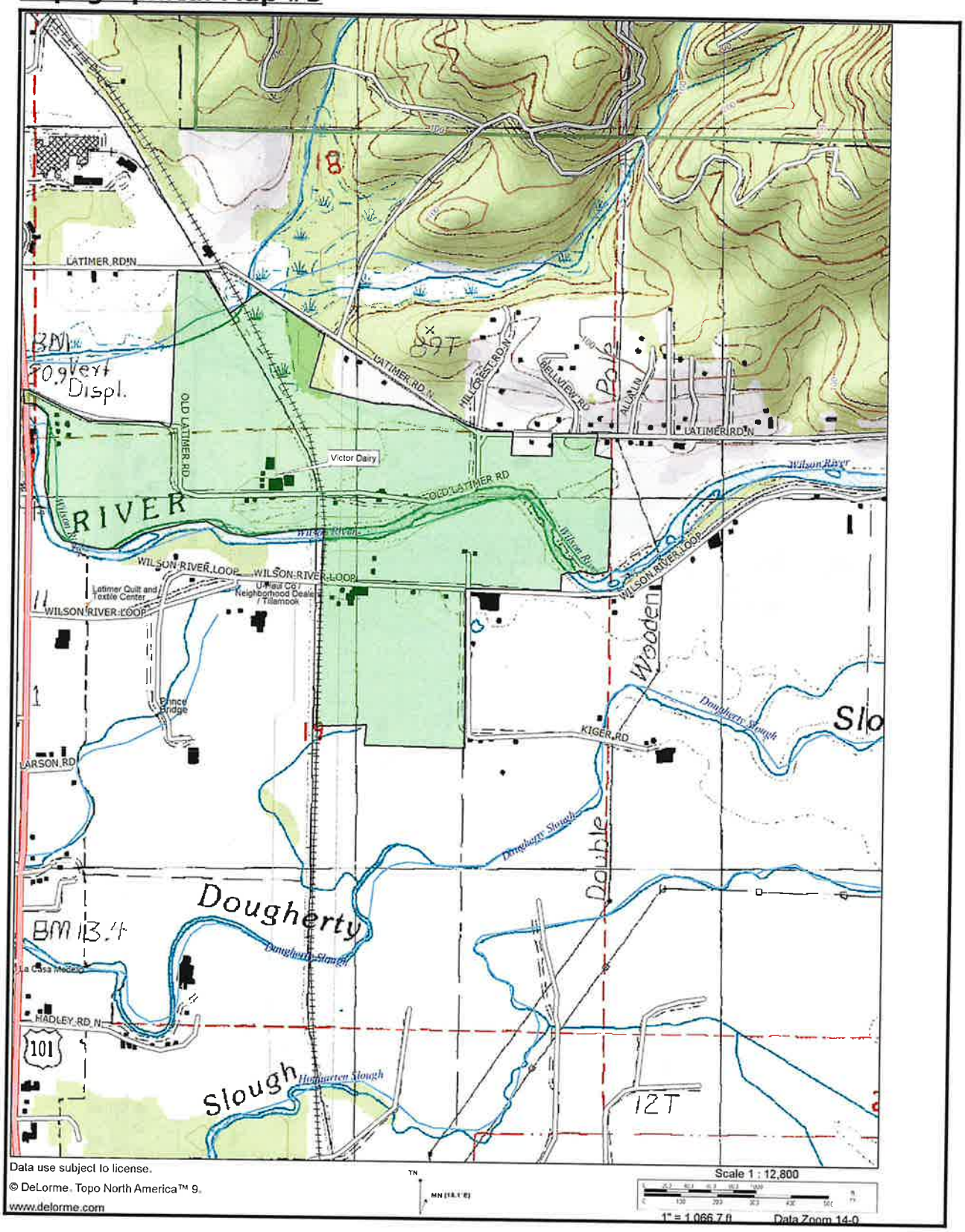
GENERAL INFORMATION

Topographical Map #4



GENERAL INFORMATION

Topographical Map #5



PRODUCTION AREA

Animal Mortality

To decrease non-point source pollution of surface and ground water resources, reduce the impact of odors that result from improperly handled animal mortality, and decrease the likelihood of the spread of disease or other pathogens, approved handling and utilization methods shall be implemented in the handling of normal mortality losses.
Animal mortalities must be handled in accordance to ORS 601.140 to prevent the discharge of pollutants to state waters. Animal mortalities will be managed to ensure that they are not disposed of in a liquid manure, storm water, process waste water storage or treatment system, or that is not specifically designed to treat animal mortalities.
Under no circumstances are animal mortalities to be disposed of in any type of liquid manure storage facility.
Guidance for Proper Management of Dead Animals
Refer to Plan for Catastrophic Animal Mortality Handling for guidance on what steps to take for a catastrophic animal mortality event. 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.

Acceptable methods and guidance for animal mortality disposal are:
Composting- Composting animal mortalities requires a composting plan be prepared and submitted to the Oregon Department of Agriculture, Natural Resources Division. A composting plan consists of a site plan drawing of the composting facility, a description of how any runoff from the facility will be contained, a description of the composting process to be used and how the compost will be used. The composting facility for animal mortalities must have a concrete floor or similar impervious surface to prevent nutrient leaching. A roof covering the animal mortality composting facility is recommended to control moisture added by rainfall and rainfall runoff. Assistance to develop a composting plan is available from the Natural Resources Division of the Oregon Department of Agriculture, (503) 986-4700. A permit is also needed from the Department of Environmental Quality (DEQ) if animal mortalities will be imported from other farms for composting.
Rapid composting of dead animals occurs when the carbon to nitrogen (C:N) ratio of the compost mix ranges between 10 and 20 to 1. To achieve the recommended C:N ratio, build the initial compost pile by placing 18 inches of sawdust or other bulking agent on the floor of the composting area. The bulking agent should extend beyond the perimeter of the animal to be composted by at least 2 feet. If using a compost bin the bulking material should extend at least 1 foot beyond the perimeter of the animal being composted. Using a bulking agent such as sawdust will absorb any liquids as the animal decomposes during the composting process.
Once the bulking agent has been placed on the floor of the composting area, place the animal carcass on top. To decrease composting time and prevent bloating the body cavity should be cut open. Cover the carcass with 1 to 3 feet of separated manure solids or other material that has a moisture content between 30 to 60 percent and a C:N ratio of not more than 30 to 1. Use 1 foot of material for small carcasses and 3 feet for large carcasses such as cattle. Be careful not to add material that is to wet as it will hinder the composting process and cause odors. Small animals can be layered in a compost pile by placing 12

inches of the bulking agent between layers as shown in the figure below. Be sure the total height of the compost pile does not exceed 7 feet in height as it may spontaneously combust causing a fire.
The first heating or primary composting cycle will take approximately 15 to 90 days depending on the size of the animal being composted. Refer to the table below for estimated primary composting times.
Check pile temperature using thermometer probe on a daily basis. The pile temperature should be checked at multiple points around the compost pile and at a point approximately 3 feet into the pile. The temperature of the compost pile should reach 130 degrees Fahrenheit (F) within a few days.
Temperatures should peak between 130 and 150 degrees F in 3 to 4 days. When the temperature of the compost pile falls below 130 degrees F, the compost needs to be aerated by turning or other means. Be sure carcasses remain covered with the bulking agent after being aerated. It is important to maintain a temperature above 130 degrees F for at least 7 days during the primary composting cycle as failure to do so may result in the incomplete destruction of pathogens and can cause fly and odor problems. After aerating the compost pile, the secondary composting times will be similar to the first.
CAUTION: It is unclear whether prions that are the proteins that cause Bovine Spongiform Encephalitis (BSE or Mad Cow Disease) are destroyed in the composting process. Animals showing signs of Mad Cow Disease and those with anthrax should not be composted and must be reported to the Oregon Department of Agriculture, Animal Health and Identification Division at (503) 986-4680 for guidance on disposal.
After aerating the compost pile by turning or other means, be sure to check the moisture content and add water if necessary being careful not to add to much water. The compost pile should feel moist to the touch but you should not be able to squeeze any water out of it.
Odors given off by the composting operation is a good indicator of how the compost operation is proceeding. Foul odors may mean that the process has turned from aerobic to anaerobic. Anaerobic conditions are the result of insufficient oxygen in the compost. This may be caused by excessive moisture in the compost or the need for turning or aerating of the compost pile.
After the composting process is finished, it may be used as a bulking agent for a new compost pile. A rule of thumb is to use 50 percent of the composted material for a bulking agent but you may want to use more or less depending on how degraded the bulking agent is in the finished compost. Using finished compost in a new compost pile reduces the amount of bulking agent needed for the new pile and provides microbial inoculants to get the composting process started.
Finished compost can also be applied to crop and pasture land fields for utilization of the nutrients and organics in the composted material. Compost from animal mortalities should not be applied to crops that will be consumed directly by humans. The nutrient content of the composted material should be determined and application equipment calibrated to ensure nutrients contained in the composted material are not over applied.

Natural Disposal- To allow nature to take its course the dead animal needs to be transported to a location at least ½ mile from any off-farm dwelling and at least ¼ mile from any water way in accordance with ORS 601.140. Once this criteria is met the carcass can be left to degrade naturally with the help of scavengers. This method is not an acceptable means of disposal for a large number of animal mortalities or for byproducts generated during butchering.

Landfill- Dead animals may be transported to a permitted landfill that accepts animal carcasses for disposal. Be sure to call the chosen landfill first to insure a landfill will accept your animal carcasses. Refer to the website given previously for permitted landfills to call. Contact the landfill operator and the DEQ at (800) 452-4011 if the landfill you would like to use is not a permitted facility to see if an exception may be granted for the disposal of animal carcasses.

Incineration- Dead animals may be burned as a method of disposal and as a method to control diseases. The economics of incineration and availability of incineration units usually make this option undesirable. A permit is needed from the Oregon Department of Environmental Quality (DEQ) Air Quality program to operate an incineration unit. Contact your DEQ at (800) 452-4011 for guidance on incineration of animal carcasses.

Burial- Dead animals may be buried in accordance with ORS 601.090(7) as a method of disposal. Large animals such as an adult cow will require a hole approximately 2 feet by 7 feet by 8 feet deep. Be sure to select a site that doesn't have a water table to insure the bottom of the hole will be dry. The animal carcass should be covered with hydrated lime and covered with at least 4 feet of soil mounded 2 feet above the natural ground line to allow for settling as the carcass decomposes. Burial sites should be located at least 500 feet down slope from surface waters or wells.
Burial is not an acceptable method of disposal for animal byproducts generated from butchering. Burial of large numbers of animal mortalities is not acceptable unless performed in accordance with a Catastrophic Animal Mortality Management Plan. Burial of imported animal mortalities is subject to disposal regulations and the Oregon Department of Environmental Quality (DEQ), the Oregon Department of Agriculture (ODA) and the local land use planning authority should be contacted.

Tillamook County Creamery Association (TCCA) Member Guidance:
Purpose- To prevent spread of disease to other livestock, preserve the environment, and minimize any negative impact to the general public who may not fully understand the reasons for the death, the disposal of the carcass must be performed in a timely and responsible manner.

Policy- TCCA requires the removal of animal carcasses from any property managed or controlled by the member. It is the responsibility of the member to notify the collection service within 24 hours of the death of an animal. The carcass shall be staged on a pad of either concrete or gravel, sloped to drain, sufficiently large so that an individual can work with solid footing when performing removal duties. The staging area must be accessible from an improved roadway, and carcasses screened from public view by either buildings or a solid fence. The staging area should be located and managed to minimize the biosecurity risk imposed by carcass collection trucks carrying disease organisms. The image of a dead animal can be disturbing to many consumers, so the staging must be behind farm buildings or a fence to minimize public viewing. If a carcass is in an advanced state of decomposition and breaks apart during handling, the member will be assessed a handling fee by TCCA.

TCCA Members will- Take time to evaluate the carcass staging area on the farm and notify the collection service in a timely manner. Call 503-801-6236 to schedule a collection.

TCCA will- Finance the collection and disposal of carcasses for all members and maintain good records of the collection.

Plan for Catastrophic Animal Mortality Handling
The following information describes how you plan to manage catastrophic loss of animals in a manner that protects surface and ground water quality. You must follow all national, state and local laws, regulations and guidelines that protect soil, water, air, plants, animals and human health.

Guidance in the event of a catastrophic animal mortality event:
Remove animal mortalities from the livestock production area and place in an area designated for mortality storage.

Contact the state veterinarian if animal death is suspicious or animal displayed unusual symptoms before death.
If it is determined that a disease outbreak may be eminent, implement procedures as

directed by the State Veterinarian. This may include killing exposed animals, burning carcasses and burial of ashes in a predetermined catastrophic mortality burial areas.
Refer to state guidance regarding appropriate catastrophic animal mortality handling methods.

Contact Information-

Organization	Phone Number
Oregon Department of Agriculture Natural Resources Division 635 Capitol St. NE Salem, OR 97301-2532	(503) 986-4699 TTD- (503) 986-4762
Oregon Emergency Response System (OERS)	(800) 452-0311
Oregon State Veterinarian USDA APHIS 530 Center Street NE, Suite 335 Salem, OR 97301	(503) 378-4710 (503) 399-5871 Fax- (503) 399-5607

Operation and Maintenance Considerations

Operation and Maintenance Considerations

Wastewater Collection Tank-

The wastewater collection tank is used to collect and temporarily store wastewater containing manure generated by the farm. Wastewater temporarily stored in the wastewater collection tank is periodically pumped to the long term wastewater storage facility. Any annual buildup of solids in the wastewater collection tank must be removed to maintain design capacity and applied to land application areas in accordance with guidance given in the nutrient management section.

Inspect the collection tank weekly to insure structural integrity. If the structural integrity of the 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.

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 collection tank completely empty during the summer months and cleanout any debris and other solid materials that may have accumulated in the tank. Inspect the tank 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 nutrient management section when applying wastewater to fields.

Do not dispose of animal carcasses in the wastewater collection 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.

Wastewater Storage Tanks-

The wastewater storage tank is used to collect and store wastewater containing manure generated by the farm. Emptying of the wastewater storage tank 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 the nutrient management section. To function properly and have the greatest management flexibility, the wastewater storage tank must be as empty as possible in the fall before the fall and winter rainy season begins. Any annual buildup of solids in the wastewater storage tank must be removed to maintain design capacity and applied to land application areas in accordance with guidance given in the nutrient management section.

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 nutrient management section 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.

Solids Storage Facility-
The solids storage facility used to store solids containing manure generated by the operation. 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 the nutrient management section. To function properly and have the greatest management flexibility, the solids storage facility 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.

Dikes and Berms-
Periodically check elevations of earthfills and restore to grade and shape, if necessary. All settlement or cracks in the dike should be investigated to determine the cause and immediately repaired.

Maintain vigorous growth of vegetative coverings. This includes reseeding, fertilization, and application of herbicides when necessary. Fertilize the established stand with at least 200 pounds of 21-0-0 per acre or equivalent annually or as needed to maintain a uniform vigorous stand. Avoid excess travel and uncontrolled grazing on any portion of the dike system that will harm or destroy vegetative cover. Periodic mowing or controlled grazing may also be needed to control height.

PRODUCTION AREA

Maintain installed fences to prevent unauthorized human access or uncontrolled grazing of dike surfaces. Livestock can be used to control vegetation height, providing grazing is controlled to short periods of time when damage to the dike surface and vegetation will not result.

Check all erosion control sections for accelerated weathering and displacement of materials. Replace to original shape and grade if necessary.
Immediately repair any vandalism, vehicular, or livestock damage to the dike or other appurtenance.

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

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.
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.
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.

Solid/Liquid Separation Facility-
Inspect the solid/liquid separation facility daily to ensure the facility is operating properly and there has been no damage to structural components. Clean screens and outlets if they have become clogged or their capacity is not adequate for proper operation of the facility.
Prevent any spillage or leakage onto roadways when transferring solids from the solid/liquid separation facility to the solids storage area and to utilization areas.

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.

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.

- Chemical storage areas are to be self-contained with no drains or other pathways that will allow spilled chemicals to exit the storage area.

- Chemical storage areas are to be covered to prevent chemical contact with rain or snow.

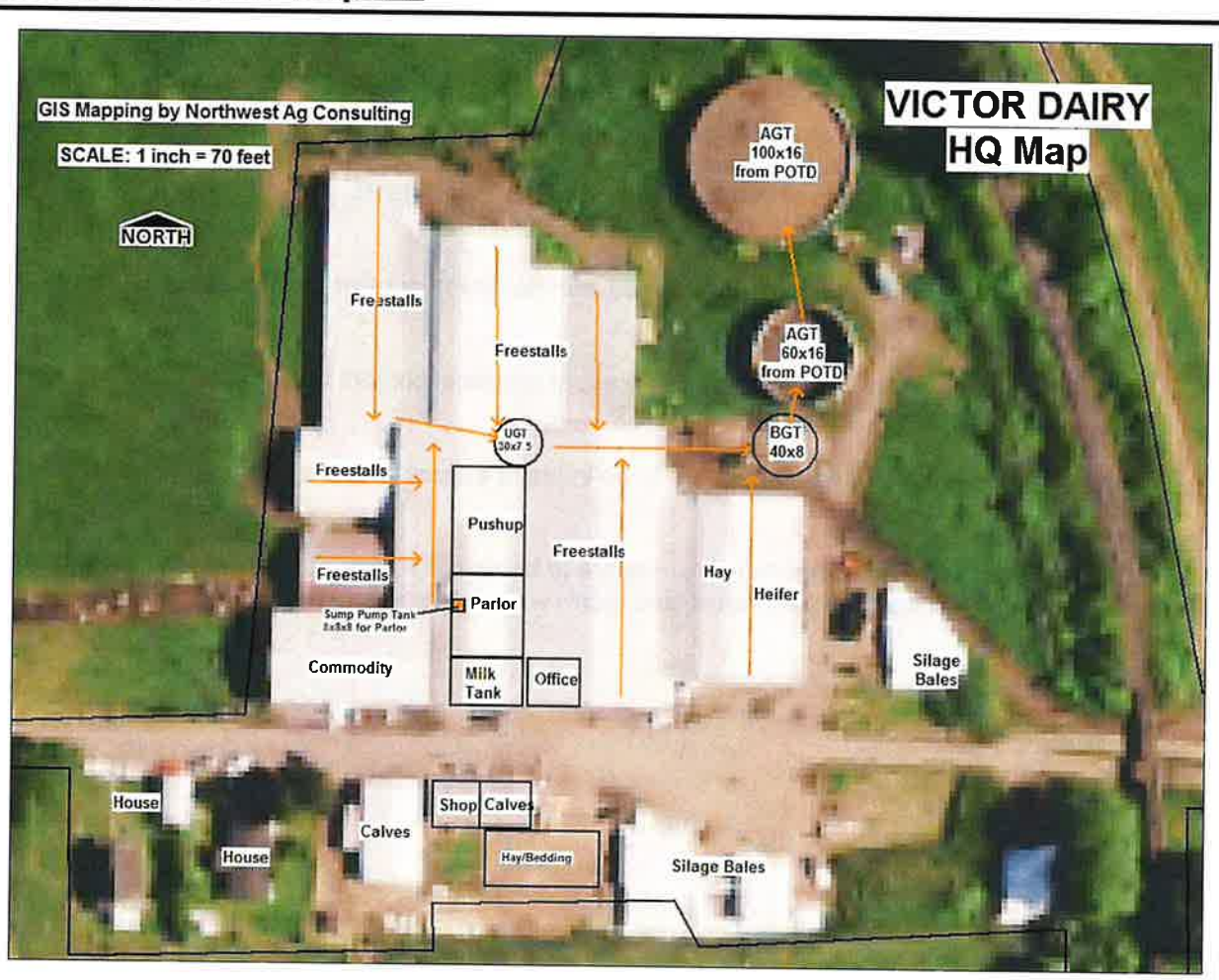
- Emergency procedures and equipment are to be in place to contain and clean up chemical spills.

- 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.

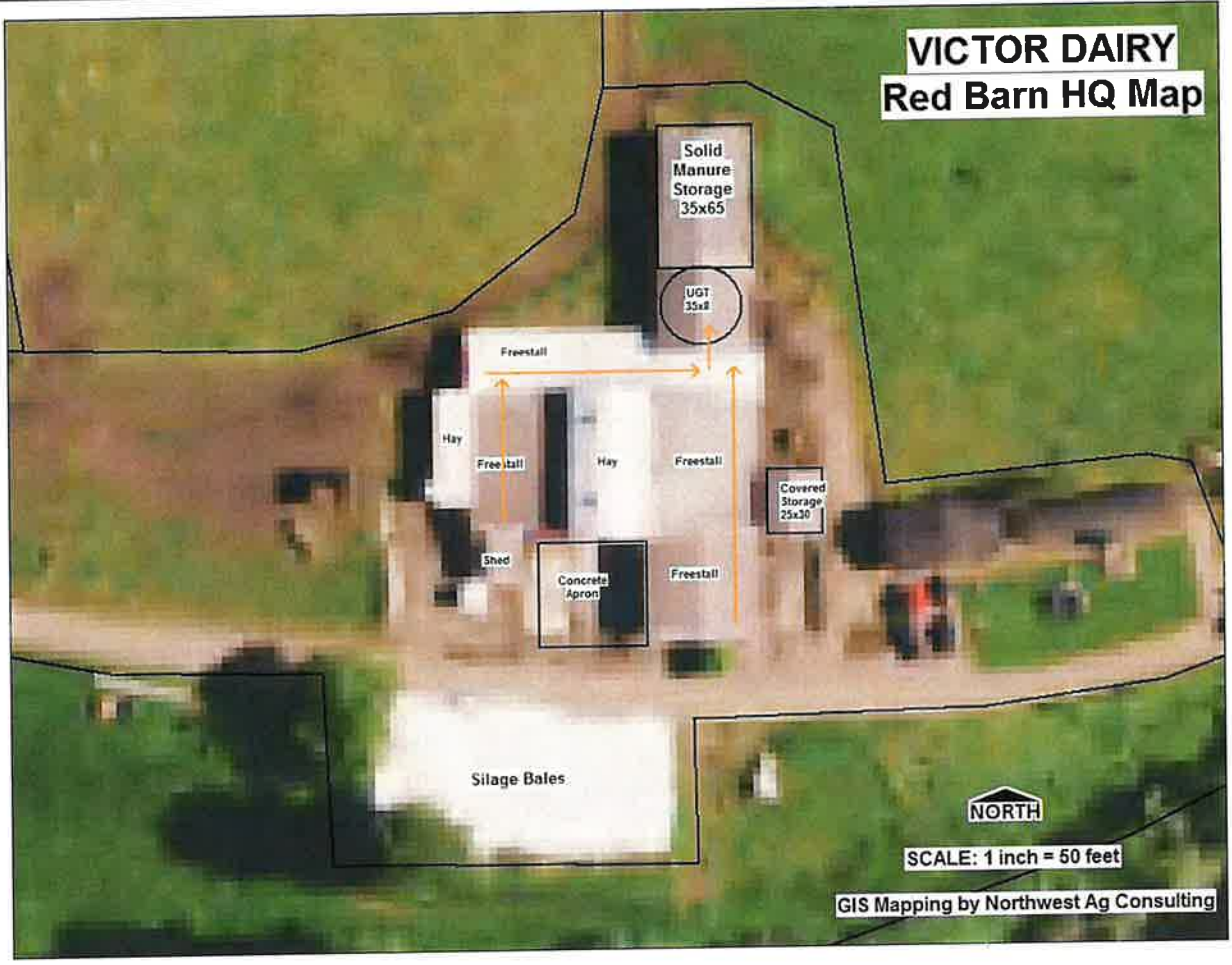
PRODUCTION AREA

Production Area Maps for Victor Dairy

Production Area Map #1

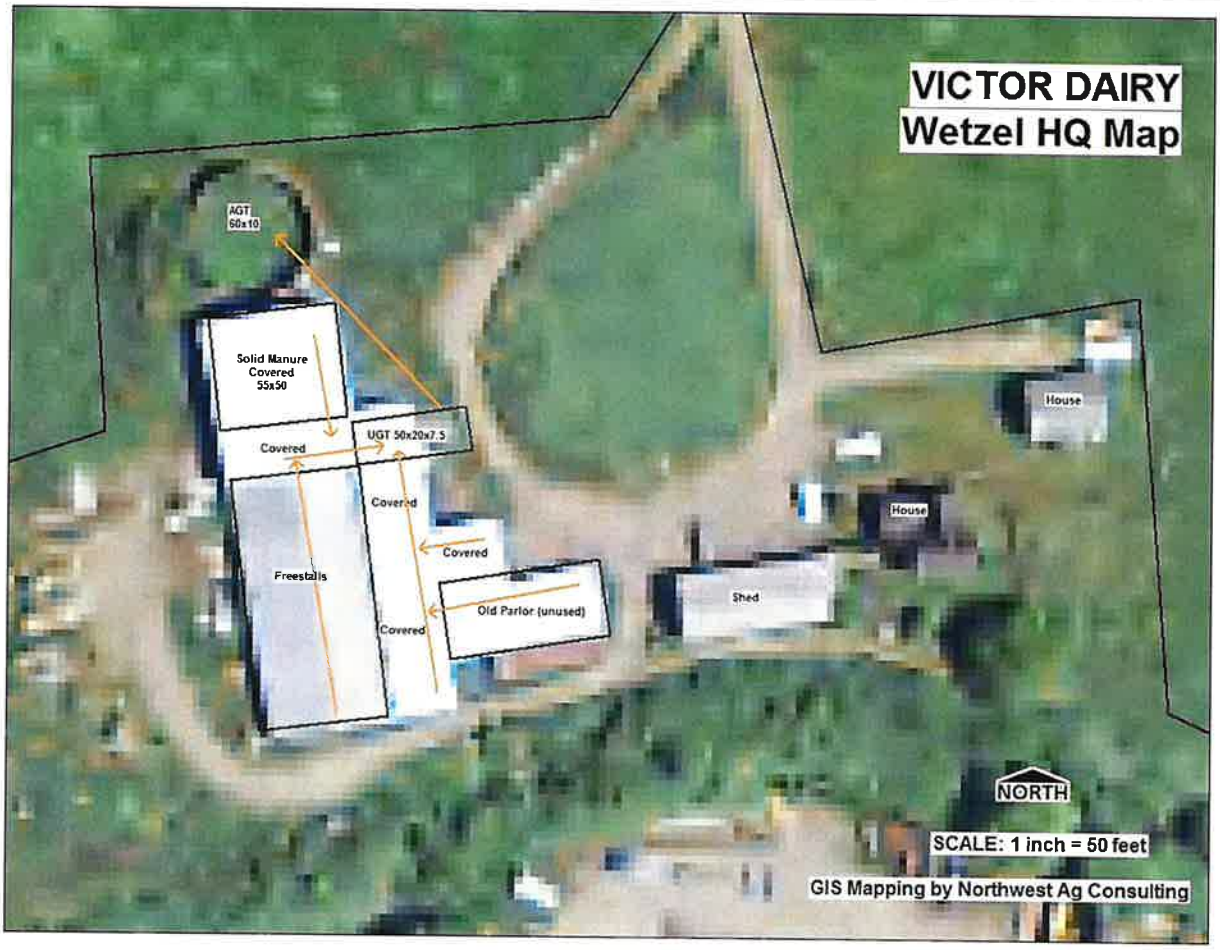


Production Area Map #2



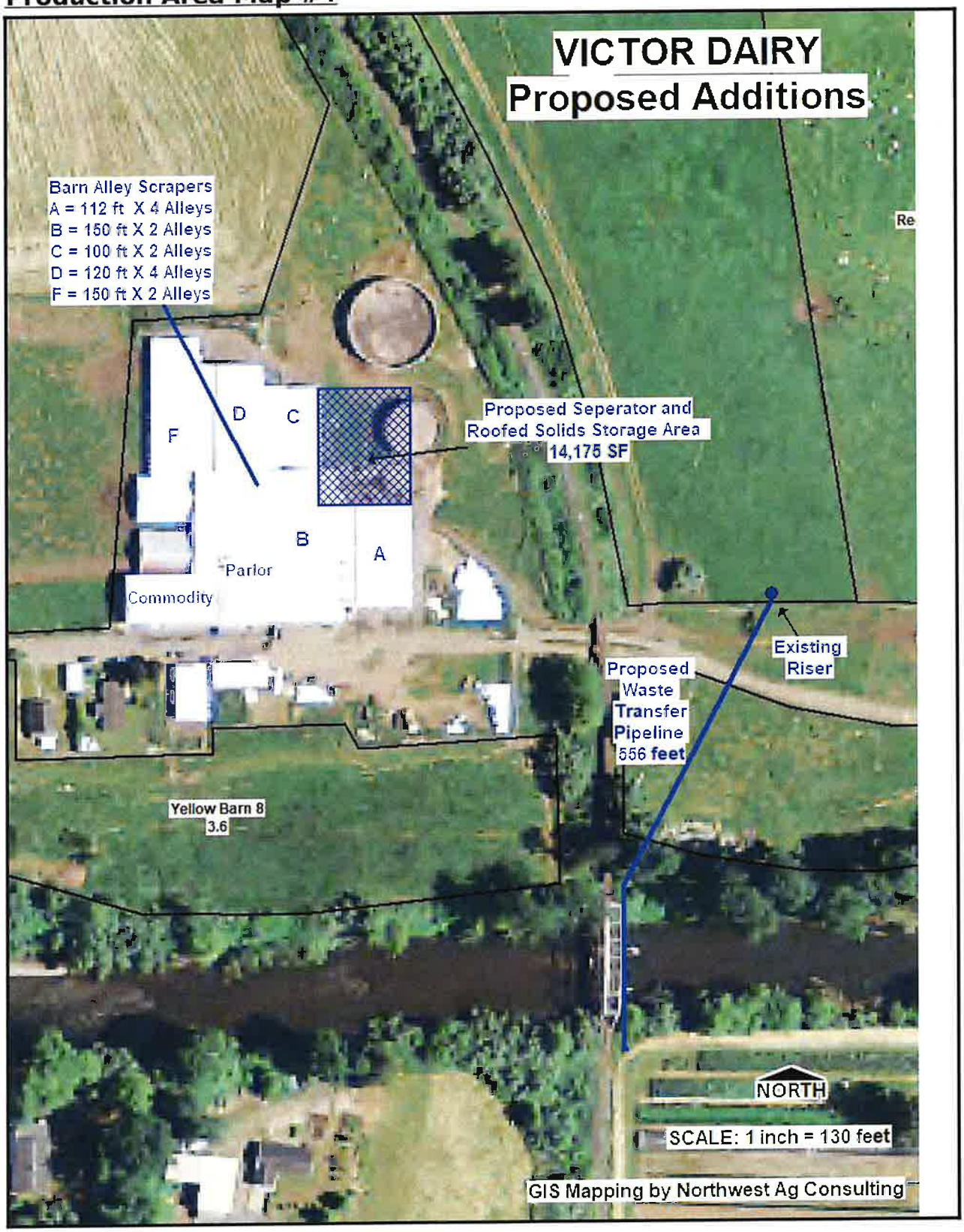
PRODUCTION AREA

Production Area Map #3



PRODUCTION AREA

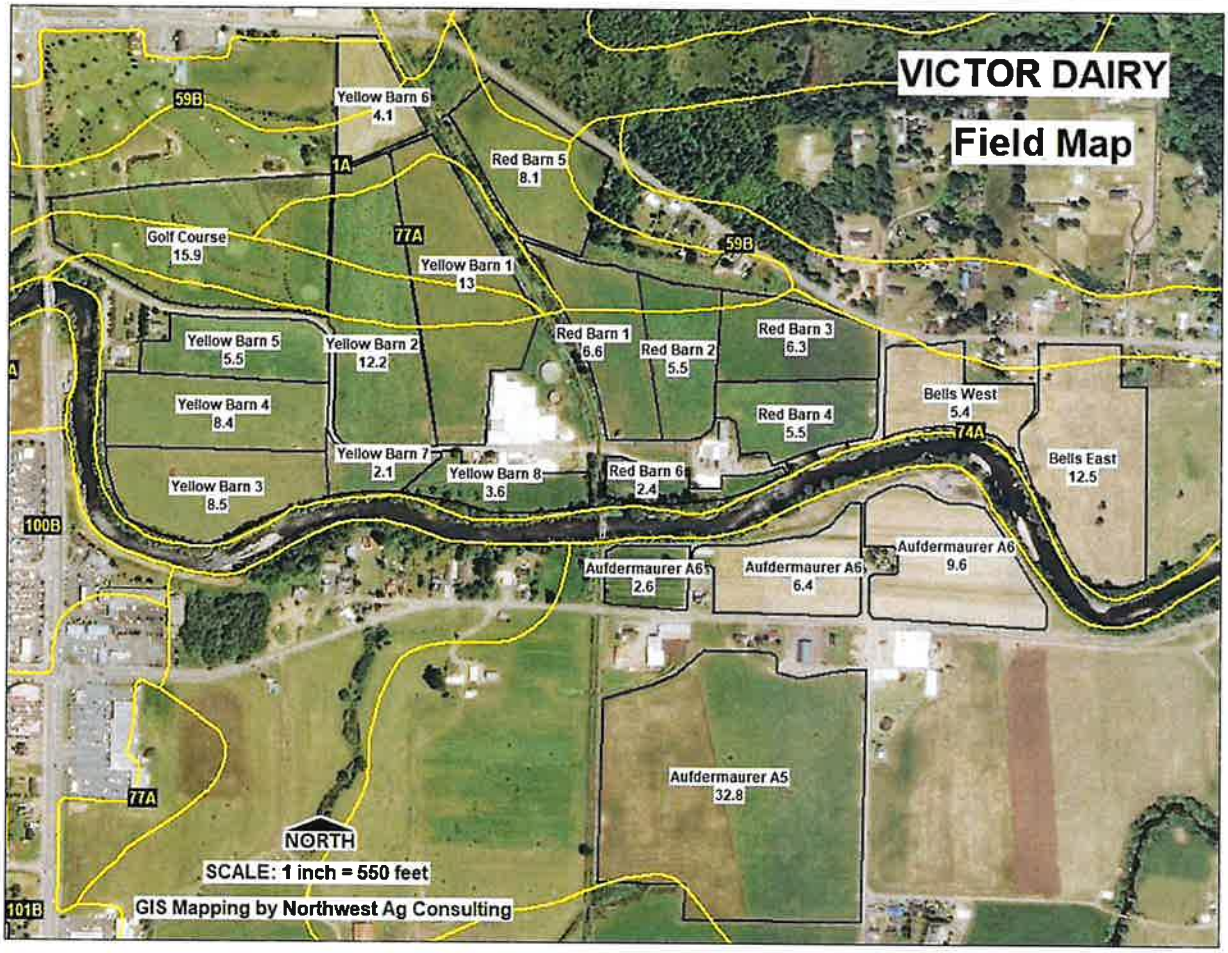
Production Area Map #4



UTILIZATION AREA

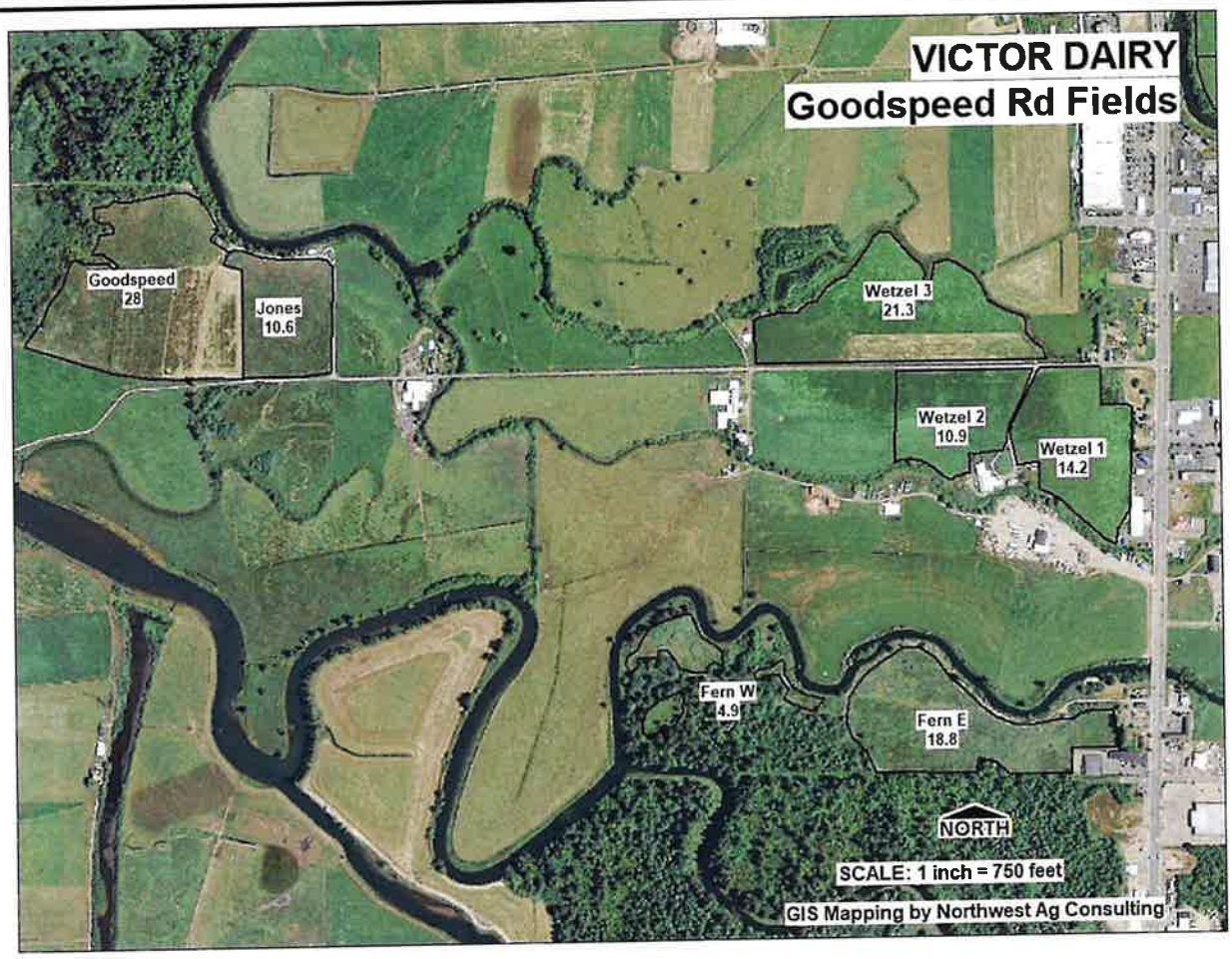
Field Maps for Victor Dairy

Field(s) Map #5



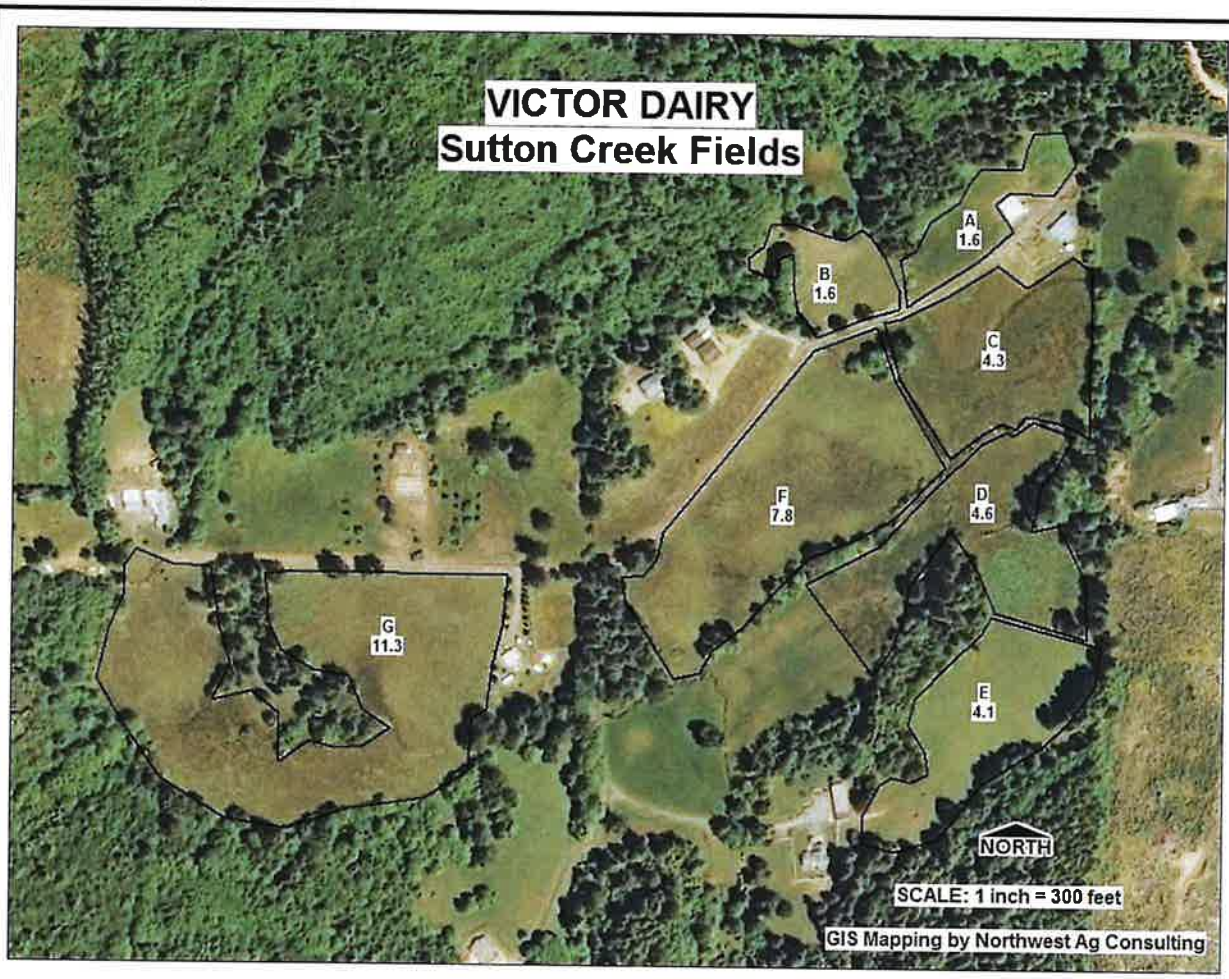
UTILIZATION AREA

Field(s) Map #6



UTILIZATION AREA

Field(s) Map #7



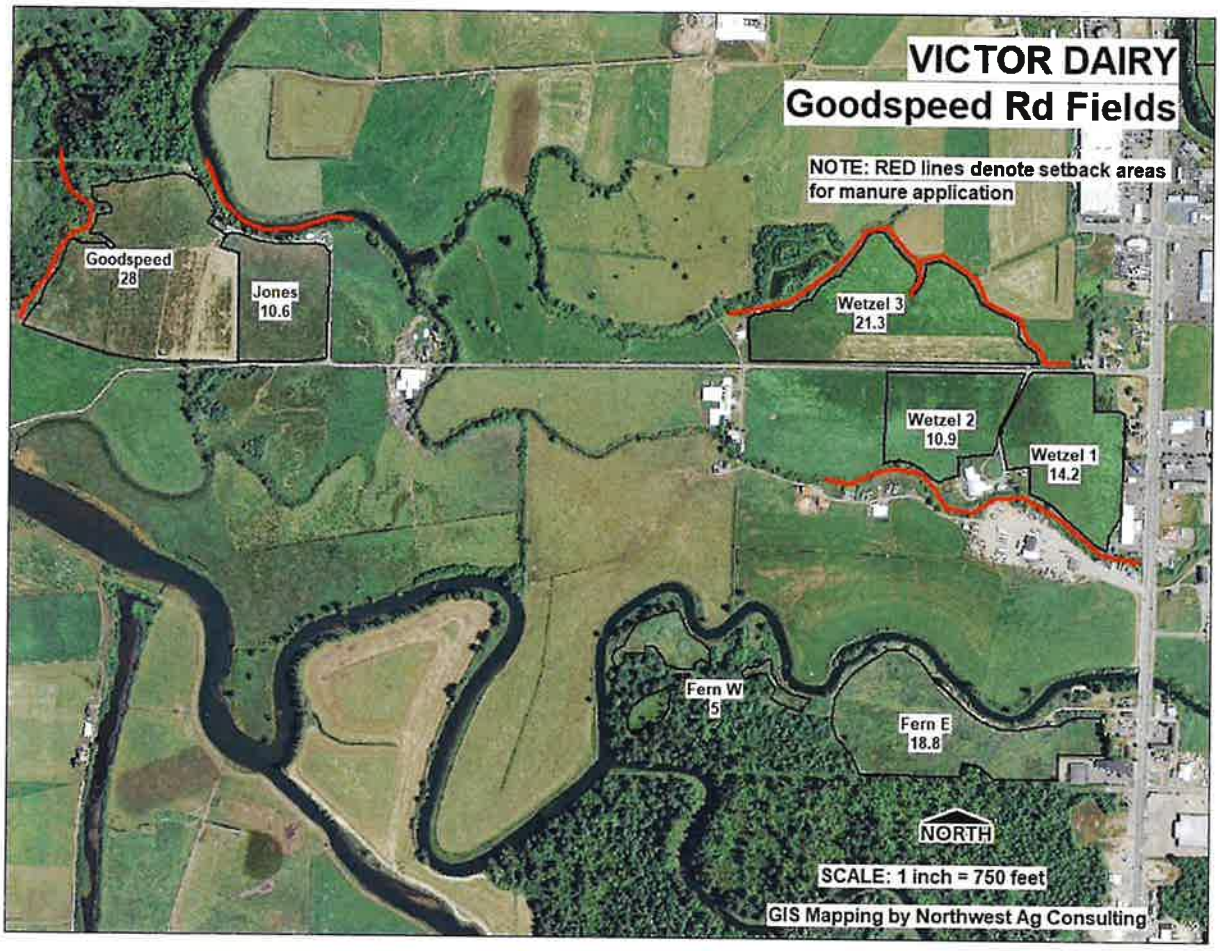
UTILIZATION AREA

Field(s) Map #8

UTILIZATION AREA

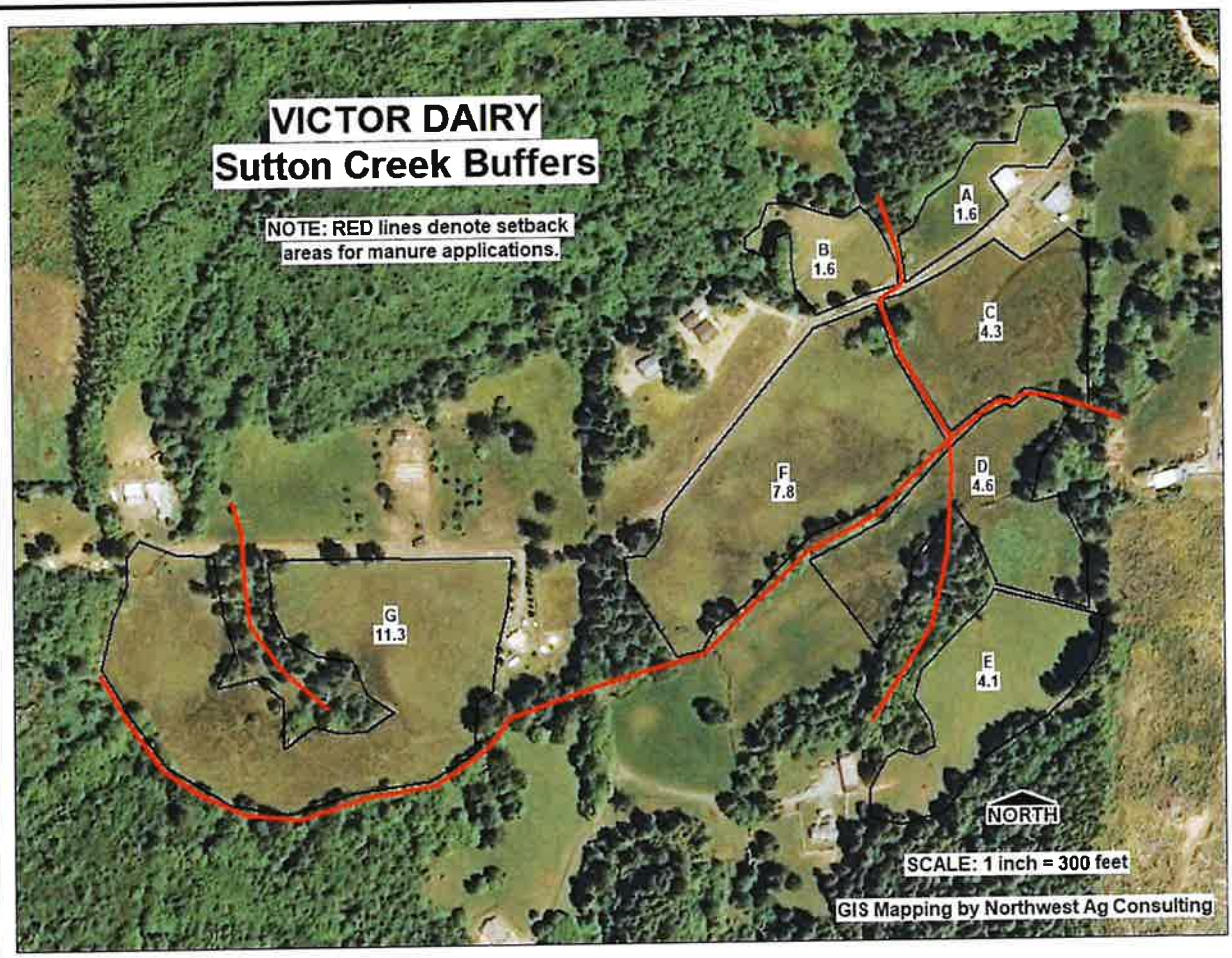
Setback Maps for Victor Dairy

Setback Map #2



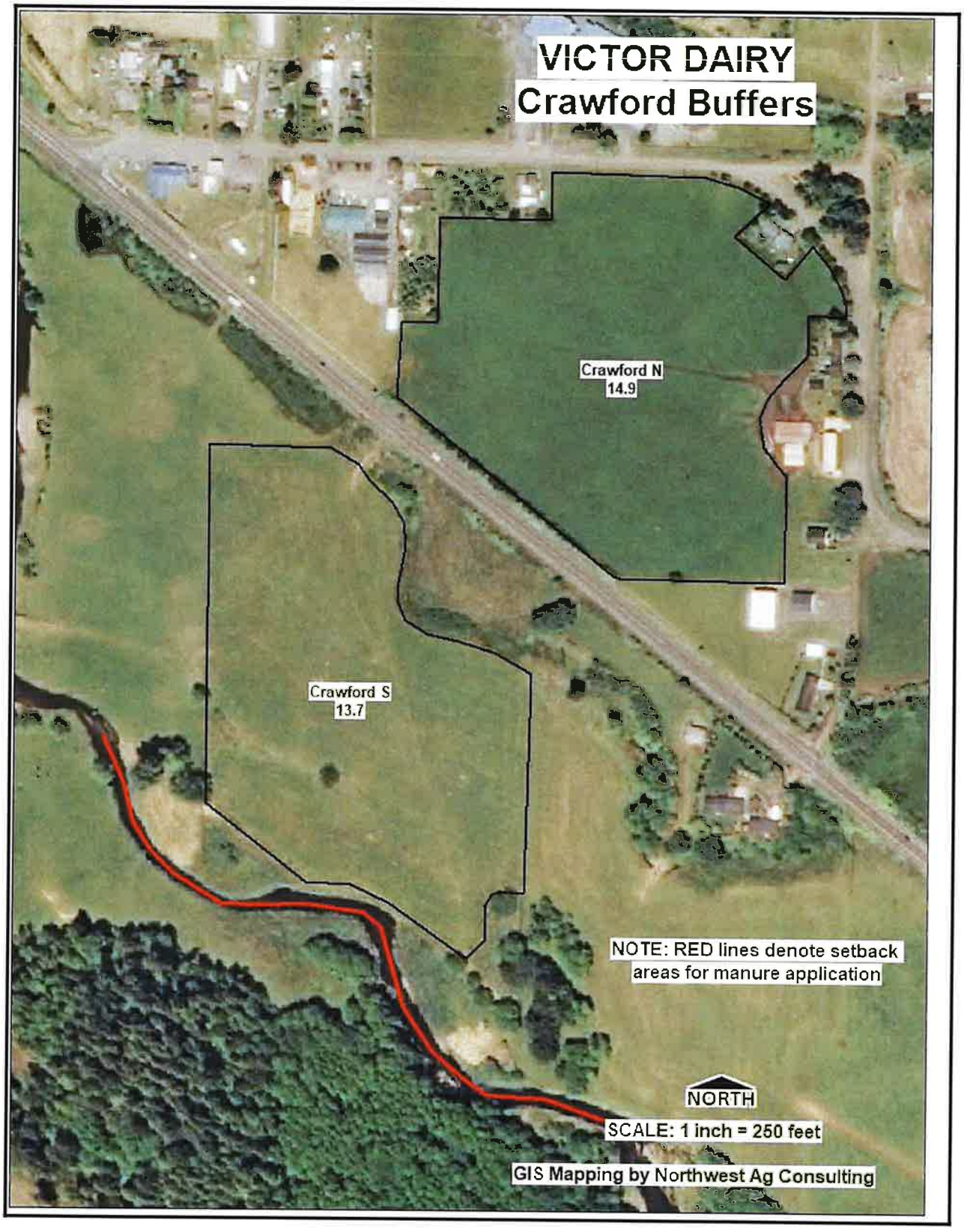
UTILIZATION AREA

Setback Map #4



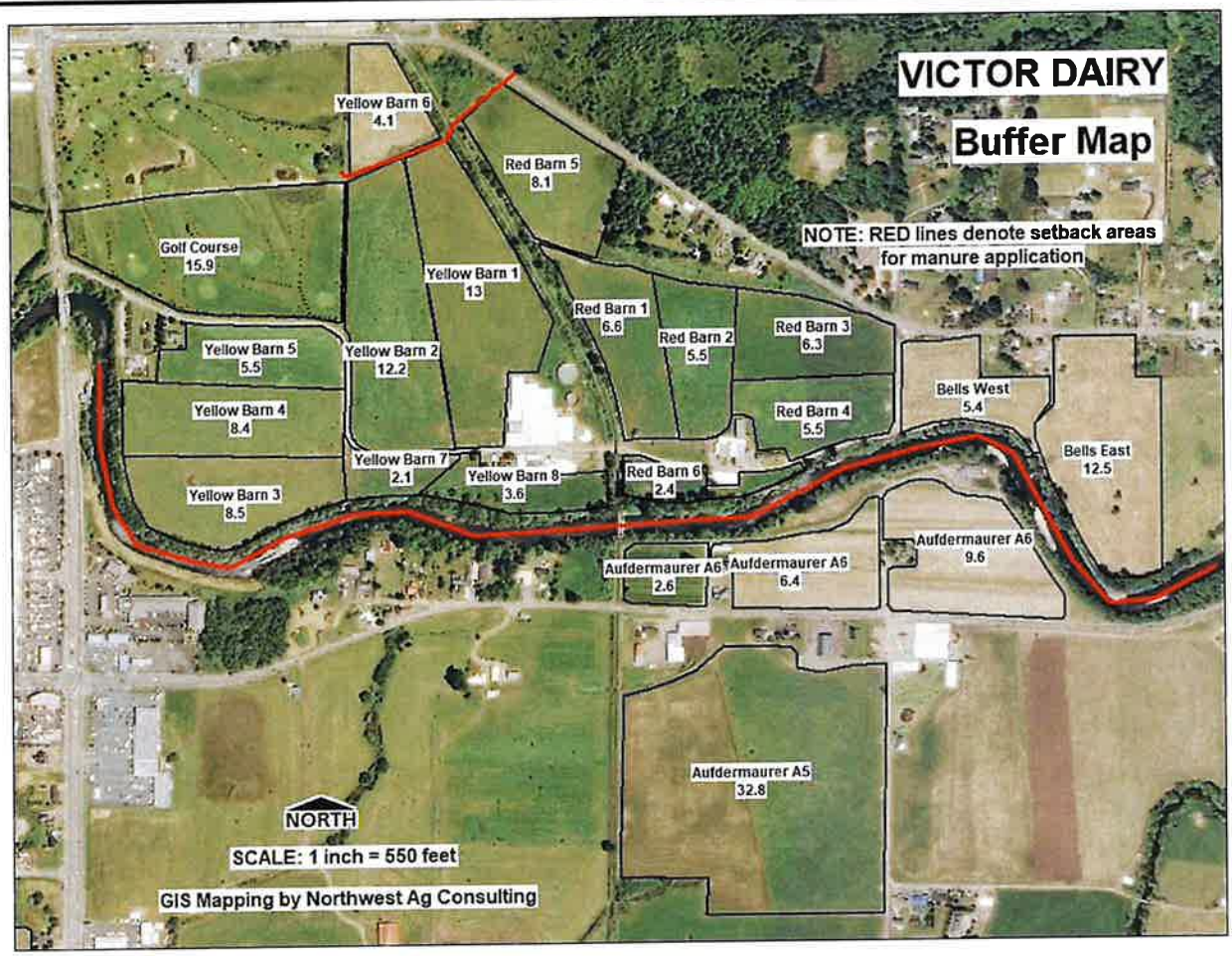
UTILIZATION AREA

Setback Map #5



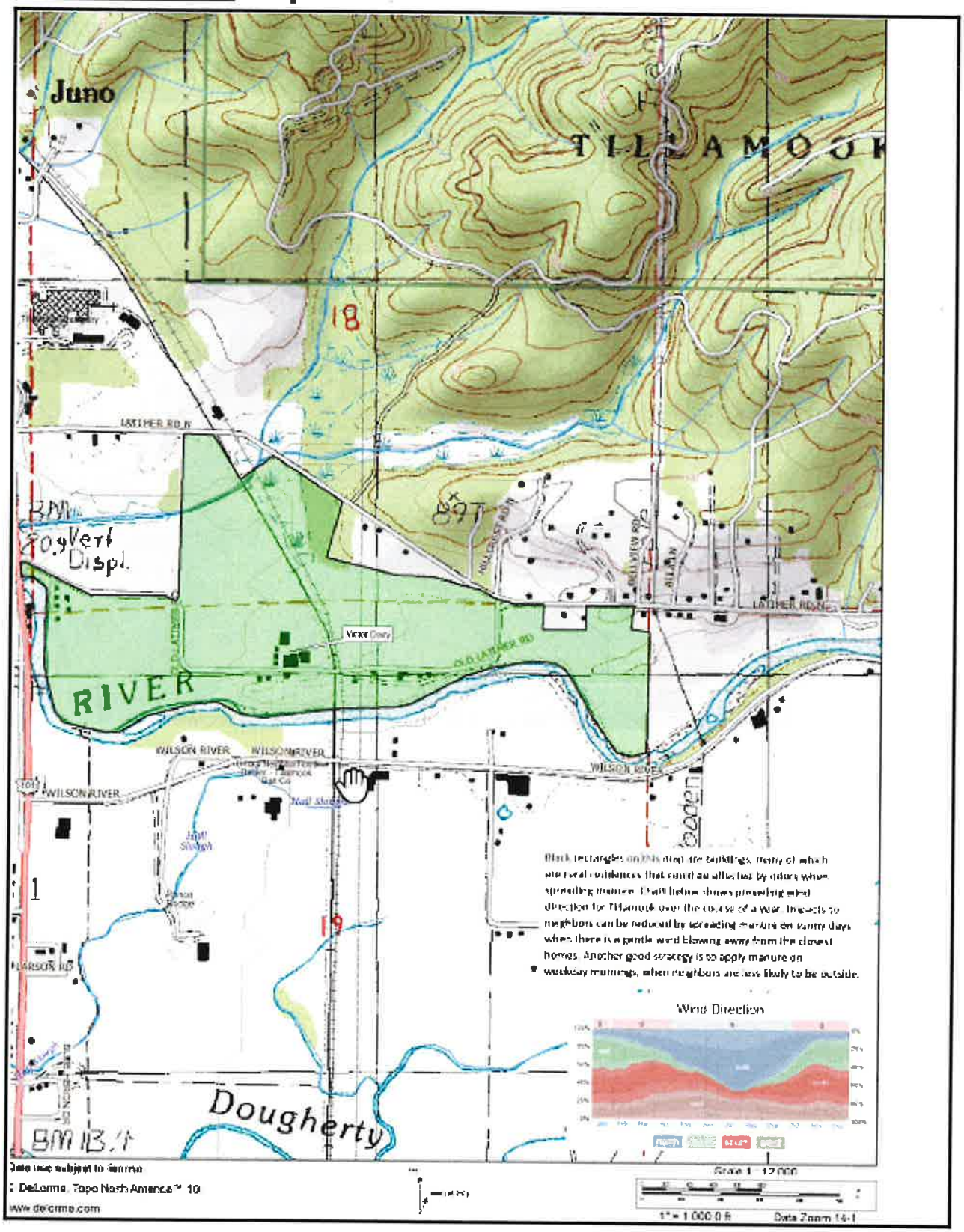
UTILIZATION AREA

Setback Map #6



UTILIZATION AREA

Wind Direction Map



Application Considerations

The manure and irrigation application systems will be calibrated in accordance with guidance in this section 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 in Section 3-2. Applications of wastewater and solids containing manure should be made in accordance with guidance in this section 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 in Section 4-3. 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.

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 AWMP 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. 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.

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 and with guidance on the calibration of application equipment.

Maintain setbacks for manure application from any surface waters. The management goal is not to allow manure to enter surface waters at any time. The following table shows **minimum setback requirements** for manure applications:

Manure	Application	Month and Setback Distance in Feet [a, b]											
Type	Equipment	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Liquid	Big gun	100	100	100	35	35	35	35	35	35	100	100	100
Liquid	Spreader Bar	100	100	35	35	35/10[c]	10	10	10	35	100	100	100
Liquid	Tank Wagon	100	100	35	35	35/10[c]	10	10	10	35	100	100	100
Liquid	Tanker Truck	100	100	35	35	35/10[c]	10	10	10	35	100	100	100
Solid	Spreader	100	100	35	35	35/10[c]	10	10	10	35	100	100	100

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.
c. This is a floating date and should be evaluated based on current weather conditions and forecast information.

Record applications, transfers or exports of nutrients (manure and fertilizer) and maintain them for at least 5 years. The CAFO Recordkeeping Calendar or other acceptable record keeping systems can be used to record this information.

CONSIDERATIONS FOR DRY SEASON MANURE APPLICATIONS:

Apply wastewater and solids containing manure at agronomic rates using the following guidelines:
Consider using T-Sum 200 as a guideline to begin making manure applications.
Do not apply during rainfall events that are expected to result in saturated soils or surface runoff.
Apply to land being prepared for crops. Till manure into soil within 3 days of application if possible or apply to actively growing crops such as grass, clover or alfalfa after cutting.
Maintain the setback buffer distances described in this section and shown on the Setback Map 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 other acceptable record keeping systems can be used to record this information.

CONSIDERATIONS FOR LATE 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 this section and shown on the Setback Map 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 4-1 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 other acceptable record keeping systems can 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.

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	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.

Load-Area Method:
The load-area method is the most accurate and can be used for both liquid and solid 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.
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:
Desired manure application rate based on soil and manure tests,
Width of the manure spread, and
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.

AMOUNT OF MANURE TO APPLY FOR CROPS GROWN

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 Yield Units per Acre X actual percent (%) dry matter (DM) of harvested crop/percent (%) dry matter (DM) from table

Total P_2O_5 to apply in pounds = P in pounds per yield unit from the table for the crop grown X Yield Units per Acre X 2.291 P_2O_5/P X actual percent (%) dry matter (DM) of harvested crop/percent (%) dry matter (DM) from table

Total K_2O to apply in pounds = K in pounds per yield unit from the table for the crop grown X Yield Units per Acre X 1.205 K_2O/K X actual percent (%) dry matter (DM) of harvested crop/percent (%) dry matter (DM) from table

Example- for a field with 5 tons per acre of grass/legume hay harvested at 90% dry matter:

Total N to apply in pounds per acre = (33.92 lb N / ton) X (5 tons / acre) X (90%DM / 100% DM) = 153 lbs N / acre

UTILIZATION AREA

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

FRUIT OR VEGETABLES

	Yield Unit	lb/Unit	% DM	Nutrient Removal (lb/yield unit) N	P	K
Beans, dry edible	cwt	100	100	3.13	0.45	0.85
Blueberries	ton	2000	100	13.93	1.30	11.57
Caneberries	ton	2000	100	11.43	7.42	11.43
Corn, Sweet	ton	2000	100	20.67	5.60	13.66
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	30.0	5.45	47.27
Squash	ton	2000	100	21.33	6.80	11.40

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	1.97	0.20	2.00
Fescue, seed (Fine or Tall)	lb	1	100	1.47	0.31	1.67
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 & Stems Removed	ton	2000	100	87.23	36.80	57.80
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	1.67	0.27	1.42
Ryegrass Seed, Straw Removed	Ton	2000	100	30.00	18.80	37.60
Ryegrass, Perennial seed	lb	1	100	0.02	0.002	0.004
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

UTILIZATION AREA

HAY AND PASTURE CROPS				Nutrient Removal (lb/yield unit)		
	Yield Unit	lb/Unit	% DM	N	P	K
Alfalfa, Hay	ton	2000	100	54.40	6.83	35.70
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	27.00	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
Sorghum-Sudan Haylage	ton	2000	100	54.40	6.40	58.00
Tall Fescue Hay/Pasture	ton	2000	100	39.40	4.00	40.00
Vetch Hay	ton	2000	100	51.93	7.20	44.76

SILAGE AND HAYLAGE CROPS				Nutrient Removal (lb/yield unit)		
	Yield Unit	lb/Unit	% DM	N	P	K
Alfalfa/Grass Haylage	ton	2000	100	15.60	1.02	6.84
Corn for Silage	ton	2000	100	25.00	4.00	20.00
Crimson Clover forage	ton	2000	100	40.00	4.48	33.28
Field Pea, Forage	ton	2000	100	73.60	8.00	18.00
Oat haylage	ton	2000	100	26.0	10.2	14.8
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	17.40
Triticale Haylage	ton	2000	100	49.00	6.80	11.40
Vetch Haylage	ton	2000	100	59.67	6.57	50.00
Wheat Haylage	ton	2000	100	41.30	5.00	57.30
Wheatgrass Hay/Pasture	ton	2000	100	49.59	6.21	68.76

OTHER CROPS				Nutrient Removal (lb/yield unit)		
	Yield Unit	lb/Unit	% DM	N	P	K
Filberts	ton	2000	100	41.70	7.30	39.29
Hops, Cones	bale	200	100	9.00	0.96	5.00
Natural Area (Trees & 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
Hemp/Cannabis	ton	2000	100	31.09	3.37	36.23

Note: Nutrient uptake values are taken from the NRCS National Agricultural Waste Management Field Handbook and updated with more current information from the Extension Service when available. When nutrient uptake values are not available from NRCS or Extension references, then nutrient uptake data from the NRCS Plant Database or other approved data sources is used.

Nutrient Applications

Nutrient Applications Report

Victor Dairy
Tillamook

Aufdermaurer A5

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
12/05/2018	Dairy 100x16 Tank	4300 wagon	100	6 Loads	17	8	18
				Aufdermaurer A5 Totals:	17	8	18

Aufdermaurer A6

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
09/07/2018	Dairy 100x16 Tank	4300 wagon	100	6 Loads	30	13	31
				Aufdermaurer A6 Totals:	30	13	31

Bell West

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
04/26/2018	Dairy 100x16 Tank	4300 wagon	100	6 Loads	105	46	107
06/04/2018	Dairy 100x16 Tank	4300 wagon	100	6 Loads	105	46	107
07/23/2018	Dairy 100x16 Tank	4300 wagon	100	6 Loads	105	46	107
09/20/2018	Dairy 100x16 Tank	4300 wagon	100	6 Loads	105	46	107
				Bell West Totals:	419	185	430

Bells East

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
04/26/2018	Dairy 100x16 Tank	4300 wagon	100	14 Loads	106	46	108
06/04/2018	Dairy 100x16 Tank	4300 wagon	100	10 Loads	75	33	77
07/23/2018	Dairy 100x16 Tank	4300 wagon	100	12 Loads	91	40	93
09/20/2018	Dairy 100x16 Tank	4300 wagon	100	14 Loads	106	46	108
				Bells East Totals:	377	166	387

Crawford N

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
05/23/2018	Dairy 100x16 Tank	4300 wagon	100	12 Loads	76	33	78
09/05/2018	Dairy 100x16 Tank	4300 wagon	100	16 Loads	101	45	104
				Crawford N Totals:	177	78	182

Crawford S

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
03/21/2018	Dairy 100x16 Tank	4300 wagon	100	14 Loads	96	42	99

05/22/2018	Dairy 100x16 Tank	4300 wagon	100	21 Loads	145	64	148
07/24/2018	Dairy 100x16 Tank	4300 wagon	100	10 Loads	69	30	71
				Crawford S Totals:	310	136	318

Fern East

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
01/16/2018	Dairy 100x16 Tank	4300 wagon	100	14 Loads	70	31	72
03/07/2018	Dairy 100x16 Tank	4300 wagon	100	13 Loads	65	29	67
05/26/2018	Dairy 100x16 Tank	4300 wagon	100	17 Loads	85	38	87
06/19/2018	Dairy 100x16 Tank	4300 wagon	100	18 Loads	90	40	93
				Fern East Totals:	311	137	319

Golf Course 1

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
03/05/2018	Dairy 100x16 Tank	4300 wagon	100	14 Loads	94	42	97
08/25/2018	Dairy 100x16 Tank	4300 wagon	100	12 Loads	81	36	83
10/23/2018	Dairy 100x16 Tank	4300 wagon	100	17 Loads	114	50	117
				Golf Course 1 Totals:	290	128	297

Goodspeed 1

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
05/17/2018	Dairy 100x16 Tank	4300 wagon	100	7 Loads	47	21	48
08/22/2018	Dairy 100x16 Tank	4300 wagon	100	18 Loads	121	53	124
				Goodspeed 1 Totals:	168	74	173

Goodspeed 2

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
05/16/2018	Dairy 100x16 Tank	4300 wagon	100	7 Loads	94	42	97
08/22/2018	Dairy 100x16 Tank	4300 wagon	100	5 Loads	67	30	69
				Goodspeed 2 Totals:	162	71	166

Goodspeed 3

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
07/17/2018	Dairy 100x16 Tank	4300 wagon	100	10 Loads	135	59	138
				Goodspeed 3 Totals:	135	59	138

Jones

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
05/23/2018	Dairy 100x16 Tank	4300 wagon	100	12 Loads	107	47	109
05/24/2018	Dairy 100x16 Tank	4300 wagon	100	1 Loads	9	4	9
07/06/2018	Dairy 100x16 Tank	4300 wagon	100	12 Loads	107	47	109
08/22/2018	Dairy 100x16 Tank	4300 wagon	100	12 Loads	107	47	109
				Jones Totals:	329	145	338

Red Barn 1

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
01/02/2018	Dairy 100x16 Tank	Drag line	100	0.38 In/Ac	243	107	249
				Red Barn 1 Totals:	243	107	249

Red Barn 5

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
06/07/2018	Dairy 100x16 Tank	4300 wagon	100	6 Loads	70	31	72
				Red Barn 5 Totals:	70	31	72

Sutton C

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
09/01/2018	Solids Storage	Truck	100	6 CF	0	0	0
				Sutton C Totals:	0	0	0

Sutton F

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
09/01/2018	Solids Storage	Truck	100	8 CF	0	0	0
				Sutton F Totals:	0	0	0

Sutton G

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
09/08/2018	Solids Storage	Truck	100	10 CF	0	0	0
				Sutton G Totals:	0	0	0

Wetzel 1

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
05/08/2018	Dairy 100x16 Tank	4300 wagon	100	17 Loads	113	50	116
06/07/2018	Dairy 100x16 Tank	4300 wagon	100	13 Loads	86	38	89
07/20/2018	Dairy 100x16 Tank	4300 wagon	100	14 Loads	93	41	95
09/09/2018	Dairy 100x16 Tank	4300 wagon	100	10 Loads	66	29	68
11/19/2018	Dairy 100x16 Tank	4300 wagon	100	13 Loads	86	38	89
				Wetzel 1 Totals:	445	196	456

Wetzel 2

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
05/20/2018	Dairy 100x16 Tank	4300 wagon	100	14 Loads	121	53	124
08/17/2018	Dairy 100x16 Tank	4300 wagon	100	12 Loads	104	46	106
11/14/2018	Dairy 100x16 Tank	4300 wagon	100	13 Loads	112	50	115
				Wetzel 2 Totals:	337	149	346

Wetzel 3

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
05/21/2018	Dairy 100x16 Tank	4300 wagon	100	6 Loads	27	12	27
08/14/2018	Dairy 100x16 Tank	4300 wagon	100	24 Loads	106	47	109
11/21/2018	Dairy 100x16 Tank	4300 wagon	100	30 Loads	133	58	136
				Wetzel 3 Totals:	266	117	272

Yellow Barn 1

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
08/27/2018	Dairy 100x16 Tank	4300 wagon	100	7 Loads	51	22	52
				Yellow Barn 1 Totals:	51	22	52

Yellow Barn 6

Date	Source	Equipment Used	% of Field	Amount Applied	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
05/14/2018	Dairy 100x16 Tank	4300 wagon	100	4 Loads	157	69	161
07/16/2018	Dairy 100x16 Tank	4300 wagon	100	4 Loads	157	69	161
				Yellow Barn 6 Totals:	314	138	322

Sampling Guidance

Manure and Soil Sampling Frequency

For large concentrated animal feeding operations, sample liquids and solids containing manure during applications in early spring annually and have each sample analyzed for Total Nitrogen (TKN), Ammonium Nitrogen (NH_4-N), Phosphorus (P_2O_5) and Potassium (K_2O) 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), https://www.mda.state.mn.us/licensing/licensetypes/mapprogram.aspx.

For small and medium animal feeding operations, 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_2O_5) and Potassium (K_2O) 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), https://www.mda.state.mn.us/licensing/licensetypes/mapprogram.aspx.

Large CAFO's are required to test a minimum of 20% of their fields annually which would result in all of the fields being tested once every five (%) years. Small and Medium CAFO's are only required to test all of their fields once every five (%) years. However, from a management standpoint, more frequent soil testing offers good information on the nutrient status of your soils.

Collect soil samples from 20 percent of the fields receiving solids or liquids containing manure **annually** in the fall after harvest or before rains begin(typically September 15-October 15) in accordance with **Pacific Northwest (PNW) Extension publication 570-E, "Monitoring Soil Nutrients Using a Management Unit Approach",** https://catalog.extension.oregonstate.edu/pnw570. 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.

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.

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"**, https://catalog.extension.oregonstate.edu/pnw570. **Oregon State University Extension publication EC1478, "Soil Test Interpretation Guide"**, https://catalog.extension.oregonstate.edu/ec1478 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. 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 grown in dry land areas.

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"**, https://catalog.extension.oregonstate.edu/pnw570, for guidance on how to evaluate nutrient applications and crop uptake of nutrients.

Manure Tests

Nutrient Analysis Report

Victor Dairy
Tillamook

Sample Date	Storage Name	Units	Total N	P_2O_5	K_2O	NH_4-N	NO_3-N	Org N	Density Lbs/CF
09/18/2013	Dairy 100x16 Tank	lbs/1000gal	24.74	8.78	30.504	14.161	0.0	10.58	62.0
04/30/2013	Solids Storage	lbs/Ton	8.76	4.422	7.083	2.92	0.0	5.84	36.0
03/29/2016	Dairy 100x16 Tank	lbs/1000gal	14.16	1.27	10.13	5.91	0.0	8.25	62.0
03/29/2016	Goodspeed 60 x10 Tank	lbs/1000gal	25.32	3.42	3.18	10.41	0.0	14.91	62.0
03/29/2016	Dairy 60x16 Tank	lbs/1000gal	26.41	4.1	3.51	13.99	0.0	12.42	62.0
01/16/2017	Dairy 100x16 Tank	lbs/1000gal	23.57	10.38	24.18	13.91	0.0	9.66	62.0
01/01/2017	Dairy 60x16 Tank	lbs/1000gal	1.99	3.35	2.5	1.49	0.0	0.5	62.0

Soil Tests

Soils Testing Report

Victor Dairy

2805 Old Latimer Road, Tillamook

Aufdermaurer A5

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/17/2017	SS5909		6.0	5.7	6.2	0.28	10.3		148.0		1310.0	8.6 meq	21.7 meq	0.32 meq	39.0 ppm	12.0 ppm	21.0	0.1	4.8	43.0	4.5	149.0		

Aufdermaurer A6

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/15/2017	SS5909		6.0	5.7	6.2	0.28	10.3		148.0		1310.0	8.6 meq	21.7 meq	0.32 meq	39.0 ppm	12.0 ppm	21.0	0.1	4.8	43.0	4.5	149.0		

Bell West

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S8740		6.0	5.9	6.4	0.27	7.2		22.0		624.0	9.3 meq	21.2 meq	0.31 meq	29.0 ppm	17.0 ppm	16.0	0.3	1.3	26.0	3.8	89.0		

Bells East

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/15/2017	S5909		6.0	6.0	6.1	0.34	7.2		22.0		415.0	7.0 meq	24.6 meq	0.39 meq	17.0 ppm	5.0 ppm	24.0	0.1	1.5	31.0	5.0	142.0		

Crawford N

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/15/2017	S5909		6.0	5.2	5.3	0.23	9.9		9.0		493.0	2.7 meq	6.9 meq	0.26 meq	29.0 ppm	18.0 ppm	70.0	0.0	3.7	41.0	1.9	158.0		

Soils Testing Report - Victor Dairy

Crawford S

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/15/2017	S5909		6.0	5.4	5.7	0.35	7.6		23.0		761.0	9.3 meq	23.1 meq	0.39 meq	27.0 ppm	12.0 ppm	32.0	0.0	2.9	34.0	3.1	160.0		

Fern East

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S8745		6.0	5.5	6.1	0.6	8.2		10.0		281.0	7.3 meq	21.3 meq	0.68 meq	18.0 ppm	7.0 ppm	36.0	0.6	1.1	22.0	5.3	185.0		

Fern West

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S8745		6.0	5.7	5.6	0.15	12.8		4.0		437.0	6.0 meq	17.6 meq		9.0 ppm	19.0 ppm	8.0	0.3	0.7	16.0	2.8	149.0		

Golf Course 1

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S5909		6.0	5.7	6.6	0.33	9.8		108.0		1110.0	7.9 meq	17.3 meq	0.38 meq	59.0 ppm	25.0 ppm	26.0	0.4	4.4	36.0	5.1	138.0		

Goodspeed 1

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S8744		6.0	4.9	5.8	1.18	10.6		11.0		440.0	8.7 meq	13.0 meq	1.35 meq	9.0 ppm	22.0 ppm	33.0	0.9	1.8	82.0	7.0	349.0		

Goodspeed 2

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S8744		6.0	4.9	5.8	1.18	10.6		11.0		440.0	8.7 meq	13.0 meq	1.35 meq	9.0 ppm	22.0 ppm	33.0	0.9	1.8	82.0	7.0	349.0		

Soils Testing Report - Victor Dairy

Goodspeed 3

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S8744		6.0	4.9	5.8	1.18	10.6		11.0		440.0	8.7 meq	13.0 meq	1.35 meq	9.0 ppm	22.0 ppm	33.0	0.9	1.8	82.0	7.0	349.0		

Jones

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S8743		6.0	5.4	6.0	0.49	14.8		13.0		431.0	10.1 meq	14.5 meq	0.56 meq	20.0 ppm	16.0 ppm	93.0	0.5	1.8	51.0	6.5	186.0		

Red Barn 1

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/15/2017	S5909		6.0	5.7	6.0	0.33	8.6		81.0		1043.0	8.6 meq	22.2 meq	0.38 meq	44.0 ppm	10.0 ppm	31.0	0.3	4.3	44.0	6.1	207.0		

Red Barn 2

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/15/2017	S5909		6.0	5.7	5.9	0.3	7.3		100.0		1051.0	8.9 meq	22.6 meq	0.34 meq	42.0 ppm	7.0 ppm	29.0	0.2	4.1	37.0	5.9	208.0		

Red Barn 3

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/15/2017	S5909		6.0	5.6	6.1	0.29	6.0		92.0		1062.0	7.9 meq	21.5 meq	0.34 meq	40.0 ppm	8.0 ppm	31.0	0.2	3.5	31.0	4.6	163.0		

Red Barn 4

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/15/2017	S5909		6.0	5.7	6.2	0.28	10.3		148.0		1310.0	8.6 meq	21.7 meq	0.32 meq	39.0 ppm	12.0 ppm	21.0	0.1	4.8	43.0	4.5	149.0		

Soils Testing Report - Victor Dairy

Red Barn 5

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/15/2017	S59029		6.0	5.6	6.1	0.57	8.0		20.0		543.0	7.3 meq	20.4 meq	0.65 meq	22.0 ppm	18.0 ppm	42.0	0.2	1.2	56.0	6.0	210.0		

Red Barn 6

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/15/2017	S5909		6.0	5.9	5.9	0.33	21.9		47.0		867.0	5.6 meq	12.4 meq	0.0 meq	36.0 ppm	69.0 ppm	18.0	0.4	4.1	31.0	2.4	186.0		

Sutton C

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/15/2017	S5909		6.0	4.5	4.7	0.15	9.0		7.0		290.0	2.0 meq	2.8 meq	0.17 meq	11.0 ppm	15.0 ppm	89.0	0.1	4.4	47.0	1.8	299.0		

Sutton E&D

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/15/2017	S5909		6.0	4.4	4.6	0.15	6.0		7.0		97.0	1.7 meq	2.0 meq	0.17 meq	9.0 ppm	12.0 ppm	64.0	0.3	3.2	27.0	2.1	343.0		

Sutton F

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/15/2017	S5909		6.0	4.37	5.0	0.18	11.21		7.0		269.0	2.7 meq	5.2 meq	0.2 meq	8.0 ppm	20.0 ppm	56.0	0.1	2.7	39.0	1.5	281.0		

Sutton G

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
9/15/2017	S5909		6.0	4.6	4.9	0.14	12.0		6.0		210.0	1.8 meq	2.2 meq	0.16 meq	8.0 ppm	15.0 ppm	64.0	0.0	3.2	23.0	1.5	304.0		

Soils Testing Report - Victor Dairy

Wetzel 1

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S8741		6.0	5.6	6.2	0.56	10.4		32.0		497.0	8.6 meq	21.5 meq	0.64 meq	40.0 ppm	11.0 ppm	37.0	0.6	2.3	46.0	7.6	198.0		

Wetzel 2

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S8741		6.0	5.6	6.2	0.56	10.4		32.0		497.0	8.6 meq	21.5 meq	0.64 meq	40.0 ppm	11.0 ppm	37.0	0.6	2.3	46.0	7.6	198.0		

Wetzel 3

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S8741		6.0	5.7	6.3	0.55	10.0		15.0		320.0	8.2 ppm	19.3 meq	0.62 meq	23.0 meq	21.0 ppm	31.0	0.4	1.8	65.0	6.3	152.0		

Yellow Barn 1

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S8739		6.0	5.7	6.6	0.33	9.8		108.0		1110.0	7.9 meq	17.3 meq	0.38 meq	59.0 ppm	25.0 ppm	26.0	0.4	4.4	36.0	5.1	138.0		

Yellow Barn 2

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S8739		6.0	5.7	6.6	0.33	9.8		108.0		1110.0	7.9 meq	17.3 meq	0.38 meq	59.0 ppm	25.0 ppm	26.0	0.4	4.4	36.0	5.1	138.0		

Yellow Barn 3

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S8739		6.0	5.8	6.5	0.31	8.0		107.0		1125.0	8.3 meq	18.9 meq	0.36 meq	60.0 ppm	21.0 ppm	22.0	0.4	3.2	39.0	4.8	127.0		

Soils Testing Report - Victor Dairy

Yellow Barn 4

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S8739		6.0	5.8	6.5	0.31	8.0		107.0		1125.0	8.3 meq	18.9 meq	0.36 meq	60.0 ppm	21.0 ppm	22.0	0.4	3.2	39.0	4.8	127.0		

Yellow Barn 5

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S8739		6.0	5.8	6.5	0.31	8.0		107.0		1125.0	8.3 meq	18.9 meq	0.36 meq	60.0 ppm	21.0 ppm	22.0	0.4	3.2	39.0	4.8	127.0		

Yellow Barn 6

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S8739		6.0	5.7	6.6	0.33	9.8		108.0		1110.0	7.9 meq	17.3 meq	0.38 meq	59.0 ppm	25.0 ppm	26.0	0.4	4.4	36.0	5.1	138.0		

Yellow Barn 7

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/7/2018	S20		6.0	5.9	5.9	0.33	21.9		47.0		867.0	5.6 meq	12.4 meq	0.0 meq	36.0 ppm	69.0 ppm	18.0	0.4	4.1	31.0	2.4	186.0		

Yellow Barn 8

Test Date	Lab #	Sample ID	Depth	pH	BpH	SS (ppm)	OM %	Ex Carb	Bray P	Olsen P	K (ppm)	Mg	Ca	Na	NO3-N	NH4-N	S (ppm)	B (ppm)	Zn (ppm)	Mn (ppm)	Cu (ppm)	Fe (ppm)	Al (ppm)	Cl (ppm)
10/17/2018	S8739		6.0	5.9	5.9	0.33	21.9		47.0		867.0	5.6 meq	12.4 meq	0.0 meq	36.0 ppm	69.0 ppm	18.0	0.4	4.1	31.0	2.4	186.0		

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/

Nutrient Balances

Nutrient Balances Report

Victor Dairy
Tillamook

Field	Acres	Crop	Yield	Nutrient Uptake (lbs/ac)			Nutrient Applied (lbs/ac)			Nutrient Balance (lbs/ac)		
				N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Aufdermaurer A5	32.8	Grass Hay/Pasture	8 Ton	464	64	320	17	8	18	(-447)	(-56)	(-302)
Aufdermaurer A6	18.6	Grass Hay/Pasture	8 Ton	464	64	320	30	13	31	(-434)	(-51)	(-289)
Bell West	5.4	Grass Hay/Pasture	8 Ton	464	64	320	419	185	430	(-45)	121	110
Bells East	12.5	Grass Hay/Pasture	8 Ton	464	64	320	377	166	387	(-87)	102	67
Crawford N	14.9	Grass Hay/Pasture	8 Ton	464	64	320	177	78	182	(-287)	14	(-138)
Crawford S	13.7	Grass Hay/Pasture	8 Ton	464	64	320	310	136	318	(-154)	72	(-2)
Fern East	18.8	Grass Hay/Pasture	8 Ton	464	64	320	311	137	319	(-153)	73	(-1)
Fern West	4.9	Grass Hay/Pasture	8 Ton	464	64	320	0	0	0	(-464)	(-64)	(-320)
Golf Course 1	14.0	Grass Hay/Pasture	8 Ton	464	64	320	290	128	297	(-174)	64	(-23)
Goodspeed 1	14.0	Grass Hay/Pasture	8 Ton	464	64	320	168	74	173	(-296)	10	(-147)
Goodspeed 2	7.0	Grass Hay/Pasture	8 Ton	464	64	320	162	71	166	(-302)	7	(-154)
Goodspeed 3	7.0	Grass Hay/Pasture	8 Ton	464	64	320	135	59	138	(-329)	(-5)	(-182)
Jones	10.6	Grass Hay/Pasture	8 Ton	464	64	320	329	145	338	(-135)	81	18
Red Barn 1	6.6	Grass Hay/Pasture	8 Ton	464	64	320	243	107	249	(-221)	43	(-71)
Red Barn 2	5.5	Grass Hay/Pasture	8 Ton	464	64	320	0	0	0	(-464)	(-64)	(-320)
Red Barn 3	6.3	Grass Hay/Pasture	8 Ton	464	64	320	0	0	0	(-464)	(-64)	(-320)
Red Barn 4	5.5	Grass Hay/Pasture	8 Ton	464	64	320	0	0	0	(-464)	(-64)	(-320)
Red Barn 5	8.1	Grass Hay/Pasture	8 Ton	464	64	320	70	31	72	(-394)	(-33)	(-248)
Red Barn 6	2.4	Grass Hay/Pasture	8 Ton	464	64	320	0	0	0	(-464)	(-64)	(-320)
Sutton C	4.3	Grass Hay/Pasture	8 Ton	464	64	320	0	0	0	(-464)	(-64)	(-320)
Sutton E&D	8.7	Grass Hay/Pasture	8 Ton	464	64	320	0	0	0	(-464)	(-64)	(-320)
Sutton F	7.8	Grass Hay/Pasture	8 Ton	464	64	320	0	0	0	(-464)	(-64)	(-320)
Sutton G	11.3	Grass Hay/Pasture	8 Ton	464	64	320	0	0	0	(-464)	(-64)	(-320)
Wetzel 1	14.2	Grass Hay/Pasture	8 Ton	464	64	320	445	196	456	(-19)	132	136
Wetzel 2	10.9	Grass Hay/Pasture	8 Ton	464	64	320	337	149	346	(-127)	85	26
Wetzel 3	21.3	Grass Hay/Pasture	8 Ton	464	64	320	266	117	272	(-198)	53	(-48)

Nutrient Balances Report - Victor Dairy

Yellow Barn 1	13.0	Grass Hay/Pasture	8	Ton	464	64	320	51	22	52	(-413)	(-42)	(-268)
Yellow Barn 2	12.2	Grass Hay/Pasture	8	Ton	464	64	320	0	0	0	(-464)	(-64)	(-320)
Yellow Barn 3	8.5	Grass Hay/Pasture	8	Ton	464	64	320	0	0	0	(-464)	(-64)	(-320)
Yellow Barn 4	8.4	Grass Hay/Pasture	8	Ton	464	64	320	0	0	0	(-464)	(-64)	(-320)
Yellow Barn 5	5.5	Grass Hay/Pasture	8	Ton	464	64	320	0	0	0	(-464)	(-64)	(-320)
Yellow Barn 6	2.4	Grass Hay/Pasture	8	Ton	464	64	320	314	138	322	(-150)	74	2
Yellow Barn 7	2.1	Grass Hay/Pasture	8	Ton	464	64	320	0	0	0	(-464)	(-64)	(-320)
Yellow Barn 8	3.6	Grass Hay/Pasture	8	Ton	464	64	320	0	0	0	(-464)	(-64)	(-320)

Export Nutrient History

Exports Report

Victor Dairy
Tillamook

Storage	Date Exported	Quantity	Analysis Available	Total N	P_2O_5	K_2O	Target
Dairy 100x16 Tank	03/07/2018	71400.0 Gal	Yes	1,682.77	741.08	1,726.32	Brice Smith
Dairy 100x16 Tank	03/08/2018	75600.0 Gal	Yes	1,781.76	784.67	1,827.87	Don Aufdermauer
Dairy 100x16 Tank	03/17/2018	25200.0 Gal	Yes	593.92	261.56	609.29	Don Aufdermauer
Dairy 100x16 Tank	03/19/2018	54600.0 Gal	Yes	1,286.83	566.71	1,320.13	Don Aufdermauer
Dairy 100x16 Tank	04/04/2018	71400.0 Gal	Yes	1,682.77	741.08	1,726.32	Brice Smith
Dairy 100x16 Tank	04/23/2018	29400.0 Gal	Yes	692.91	305.15	710.84	C&C Dairy
Dairy 100x16 Tank	04/24/2018	163800.0 Gal	Yes	3,860.48	1,700.12	3,960.39	C&C Dairy
Dairy 100x16 Tank	04/25/2018	54600.0 Gal	Yes	1,286.83	566.71	1,320.13	Don Aufdermauer
Dairy 100x16 Tank	04/28/2018	42000.0 Gal	Yes	989.87	435.93	1,015.49	C&C Dairy
Dairy 100x16 Tank	05/01/2018	29400.0 Gal	Yes	692.91	305.15	710.84	C&C Dairy
Dairy 100x16 Tank	05/09/2018	21000.0 Gal	Yes	494.93	217.96	507.74	Don Aufdermauer
Dairy 100x16 Tank	05/14/2018	100800.0 Gal	Yes	2,375.68	1,046.23	2,437.16	Don Aufdermauer
Dairy 100x16 Tank	05/28/2018	86000.0 Gal	Yes	2,026.87	892.61	2,079.33	C&C Dairy
Dairy 100x16 Tank	05/31/2018	21500.0 Gal	Yes	506.72	223.15	519.83	Barkers corn field
Dairy 100x16 Tank	06/01/2018	38700.0 Gal	Yes	912.09	401.68	935.7	Barkers corn field
Dairy 100x16 Tank	06/29/2018	17200.0 Gal	Yes	405.37	178.52	415.87	C&C Dairy
Dairy 100x16 Tank	10/01/2018	146200.0 Gal	Yes	3,445.68	1,517.44	3,534.86	C&C Dairy
Dairy 100x16 Tank	10/21/2018	81700.0 Gal	Yes	1,925.53	847.98	1,975.36	Don Aufdermauer
Dairy 100x16 Tank	10/30/2018	86000.0 Gal	Yes	2,026.87	892.61	2,079.33	Brice Smith
Dairy 100x16 Tank	11/13/2018	43000.0 Gal	Yes	1,013.44	446.31	1,039.66	Brice Smith
Sub Totals:		168,370 CF		29,684.23	13,072.65	30,452.47	
Solids Storage	09/19/2018	7700.0 CF	Yes	504.54	254.69	407.95	Kris Aufdermauer
Sub Totals:		7,700 CF		504.54	254.69	407.95	
Totals:		176,070 CF		30,188.77	13,327.34	30,860.42	

Cropping History

Cropping Report

Victor Dairy

Tillamook

Planted	Field	Acres	Crop	Yield	Nutrient Uptake (lbs/ac) N	P_2O_5	K_2O
01/01/2018	Aufdermaurer A5	32.8	Grass Hay/Pasture	8 Ton	464	64	320
	Aufdermaurer A5 Totals:				464	64	320
01/01/2018	Aufdermaurer A6	18.6	Grass Hay/Pasture	8 Ton	464	64	320
	Aufdermaurer A6 Totals:				464	64	320
01/01/2018	Bell West	5.4	Grass Hay/Pasture	8 Ton	464	64	320
	Bell West Totals:				464	64	320
01/01/2018	Bells East	12.5	Grass Hay/Pasture	8 Ton	464	64	320
	Bells East Totals:				464	64	320
01/01/2018	Crawford N	15.0	Grass Hay/Pasture	8 Ton	464	64	320
	Crawford N Totals:				464	64	320
01/01/2018	Crawford S	15.0	Grass Hay/Pasture	8 Ton	464	64	320
	Crawford S Totals:				464	64	320
01/01/2018	Fern East	18.7	Grass Hay/Pasture	8 Ton	464	64	320
	Fern East Totals:				464	64	320
01/01/2018	Fern West	3.0	Grass Hay/Pasture	8 Ton	464	64	320
	Fern West Totals:				464	64	320
01/01/2018	Golf Course 1	14.0	Grass Hay/Pasture	8 Ton	464	64	320
	Golf Course 1 Totals:				464	64	320
01/01/2018	Goodspeed 1	14.0	Grass Hay/Pasture	8 Ton	464	64	320
	Goodspeed 1 Totals:				464	64	320
01/01/2018	Goodspeed 2	7.0	Grass Hay/Pasture	8 Ton	464	64	320
	Goodspeed 2 Totals:				464	64	320
01/01/2018	Goodspeed 3	7.0	Grass Hay/Pasture	8 Ton	464	64	320
	Goodspeed 3 Totals:				464	64	320
01/01/2018	Jones	10.6	Grass Hay/Pasture	8 Ton	464	64	320
	Jones Totals:				464	64	320
01/01/2018	Red Barn 1	6.6	Grass Hay/Pasture	8 Ton	464	64	320
	Red Barn 1 Totals:				464	64	320
01/01/2018	Red Barn 2	5.5	Grass Hay/Pasture	8 Ton	464	64	320
	Red Barn 2 Totals:				464	64	320
01/01/2018	Red Barn 3	6.3	Grass Hay/Pasture	8 Ton	464	64	320
	Red Barn 3 Totals:				464	64	320

Cropping Report - Victor Dairy

Planted	Field	Acres	Crop	Yield	Nutrient Uptake (lbs/ac) N	P_2O_5	K_2O
01/01/2018	Red Barn 4	5.5	Grass Hay/Pasture	8 Ton	464	64	320
	Red Barn 4 Totals:				464	64	320
01/01/2018	Red Barn 5	8.1	Grass Hay/Pasture	8 Ton	464	64	320
	Red Barn 5 Totals:				464	64	320
01/01/2018	Red Barn 6	2.4	Grass Hay/Pasture	8 Ton	464	64	320
	Red Barn 6 Totals:				464	64	320
01/01/2018	Sutton C	4.3	Grass Hay/Pasture	8 Ton	464	64	320
	Sutton C Totals:				464	64	320
01/01/2018	Sutton E&D	8.7	Grass Hay/Pasture	8 Ton	464	64	320
	Sutton E&D Totals:				464	64	320
01/01/2018	Sutton F	7.8	Grass Hay/Pasture	8 Ton	464	64	320
	Sutton F Totals:				464	64	320
01/01/2018	Sutton G	11.3	Grass Hay/Pasture	8 Ton	464	64	320
	Sutton G Totals:				464	64	320
01/01/2018	Wetzel 1	14.2	Grass Hay/Pasture	8 Ton	464	64	320
	Wetzel 1 Totals:				464	64	320
01/01/2018	Wetzel 2	10.9	Grass Hay/Pasture	8 Ton	464	64	320
	Wetzel 2 Totals:				464	64	320
01/01/2018	Wetzel 3	21.3	Grass Hay/Pasture	8 Ton	464	64	320
	Wetzel 3 Totals:				464	64	320
01/01/2018	Yellow Barn 1	13.0	Grass Hay/Pasture	8 Ton	464	64	320
	Yellow Barn 1 Totals:				464	64	320
01/01/2018	Yellow Barn 2	12.2	Grass Hay/Pasture	8 Ton	464	64	320
	Yellow Barn 2 Totals:				464	64	320
01/01/2018	Yellow Barn 3	8.5	Grass Hay/Pasture	8 Ton	464	64	320
	Yellow Barn 3 Totals:				464	64	320
01/01/2018	Yellow Barn 4	8.4	Grass Hay/Pasture	8 Ton	464	64	320
	Yellow Barn 4 Totals:				464	64	320
01/01/2018	Yellow Barn 5	5.5	Grass Hay/Pasture	8 Ton	464	64	320
	Yellow Barn 5 Totals:				464	64	320
01/01/2018	Yellow Barn 6	4.1	Grass Hay/Pasture	8 Ton	464	64	320
	Yellow Barn 6 Totals:				464	64	320
01/01/2018	Yellow Barn 7	2.1	Grass Hay/Pasture	8 Ton	464	64	320
	Yellow Barn 7 Totals:				464	64	320
01/01/2018	Yellow Barn 8	3.6	Grass Hay/Pasture	8 Ton	464	64	320
	Yellow Barn 8 Totals:				464	64	320

UTILIZATION AREA

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.

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. More information about Oregon water rights can be found at http://www.oregon.gov/owrd/Pages/wr/index.aspx.

The irrigation system used to irrigate crops should be adapted for site conditions (soil, slope, crop grown, climate, water quantity and quality, etc.) and capable of applying water and wastewater to meet the consumptive use of the crop. The following table shows the estimated Available Water Holding Capacity (AWHC) and sprinkler intake rates by soil texture that should be considered in the design of the irrigation system.1/

Symbol	Soil Texture	AWHC Range (in/in)	Sprinkler Intake Rate Range (in/hour)
COS	Coarse Sand	0.01-0.03	1.0+
S	Sand	0.01-0.03	0.5+
FS	Fine Sand	0.05-0.07	0.5+
VFS	Very Fine Sand	0.05-0.07	0.5+
LCOS	Loamy Coarse Sand	0.06-0.08	1.0+
LS	Loamy Sand	0.06-0.08	0.4-1.5
LFS	Loamy Fine Sand	0.09-0.11	0.4-1.5
LVFS	Loamy Very Fine Sand	0.10-0.12	0.3-1.25
COSL	Coarse Sandy Loam	0.10-0.12	0.3-1.25
SL	Sandy Loam	0.11-0.13	0.3-1.25
FSL	Fine Sandy Loam	0.13-0.15	0.3-1.0
VFSL	Very Fine Sandy Loam	0.15-0.17	0.3-1.0
L	Loam	0.16-0.18	0.6-0.7
SIL	Silt Loam	0.19-0.21	0.5-0.7
SI	Silt Loam	0.16-0.18	0.5-0.7
SCL	Sandy Clay Loam	0.14-0.16	0.1-0.5
CL	Clay Loam	0.19-0.21	0.1-0.5
SICL	Silty Clay Loam	0.19-0.21	0.1-0.4
SC	Sandy Clay	0.15-0.17	0.1-0.4
SIC	Silty Clay	0.15-0.17	0.1-0.2
C	Clay	0.14-0.16	0.1-0.2

1/ Values in this table are taken from the Natural Resources Conservation Service National Engineering Handbook, Part 652, Irrigation Guide and are estimates based on soil texture and should only be used where local data is unavailable.

Irrigation water management requires knowledge, skills, and desire to determine when irrigation water should be applied. The main factors influencing IWM are irrigation interval (time between irrigations), irrigation set time (time water is applied), and application rate (rate at which water is applied). These parameters define the timing and duration of irrigation and the amount of water applied. System design and maintenance are also important factors influencing irrigation water management.

UTILIZATION AREA

Guidance given in the irrigation water requirements worksheets was developed based on Oregon State University Extension Miscellaneous 8530, Oregon Crop Water Use and Irrigation Requirements publication. For additional information on irrigation water management contact a professional with the required knowledge and skill. The following average monthly evapotranspiration and precipitation graphs can be used to estimate when to irrigate and how much to apply:

UTILIZATION AREA

Irrigation Water Flows, Volumes, and Relationships

Equation 1 -

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

wher

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

Equation 2 -

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

wher

Q = flow rate (acre-in/hr or cfs)
A = area (acres)
D = gross depth applied (in)
F = irrigation period (days)
H = Hours of operation per

Water Flow

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 where:

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

Gpm for 5 ft/s velocity in PVC pipe:

6"	8"	10"	12"	14"
480	800	125	175	215

Water Volumes & Weights:

1 cubic foot = 7.48 gallons
= 62.4 lbs = 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

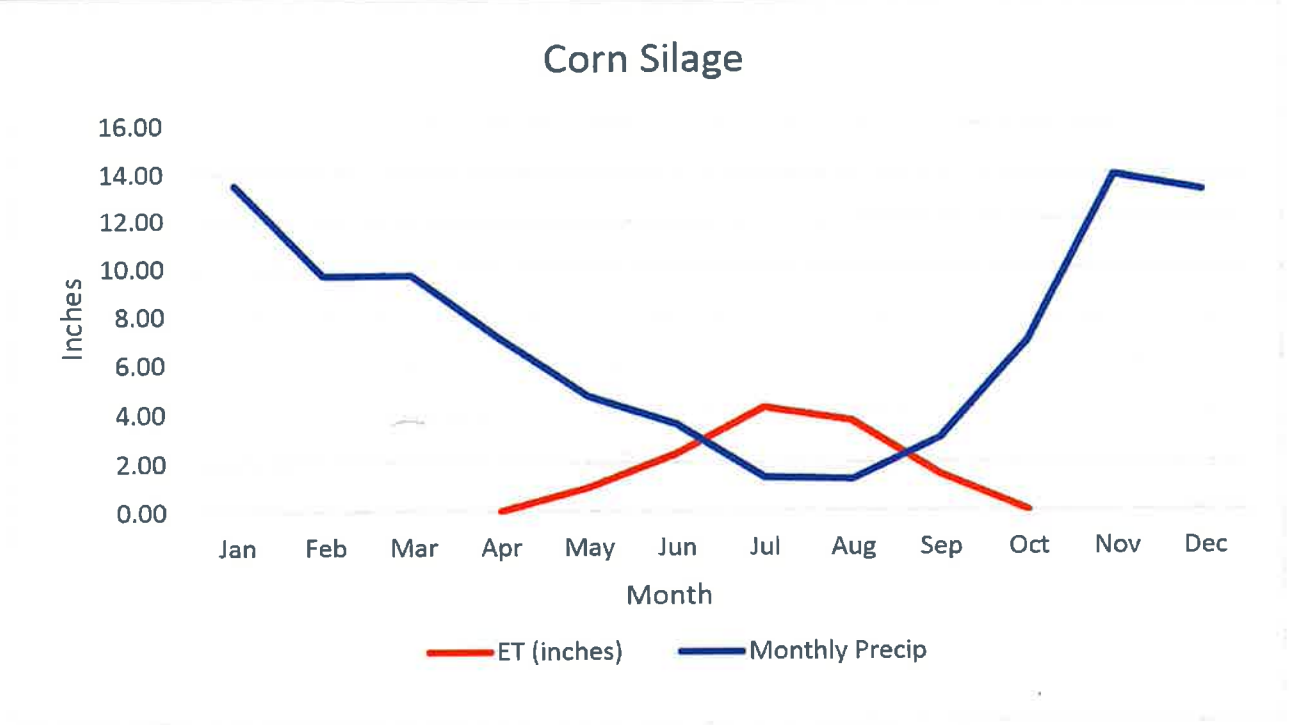
Pump Power Requirement

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

UTILIZATION AREA

Crop- Corn Silage
Region- Coastal

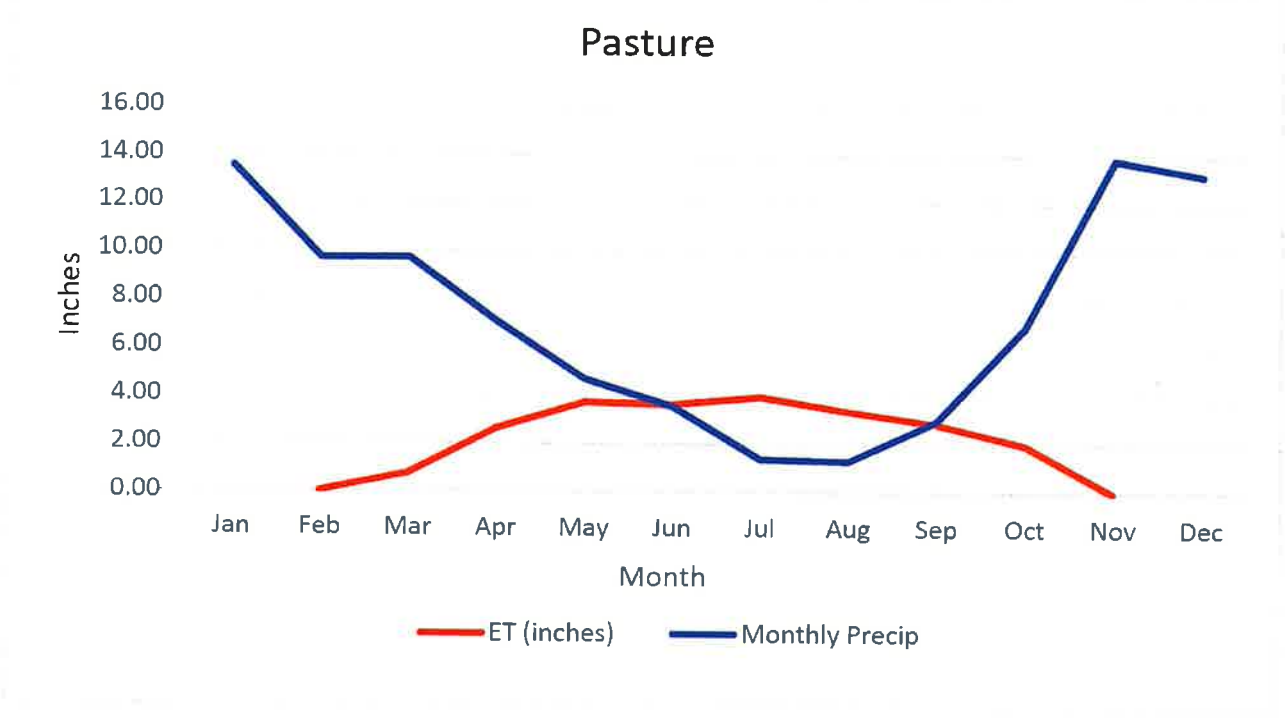
Total Seasonal Evapotranspiration-	12.79	Inches
Peak Evapotranspiration Rate-	0.14	Inches/Day
Maximum Allowed Depletion-	50	%
Critical Moisture Deficit Period-	Jul	



UTILIZATION AREA

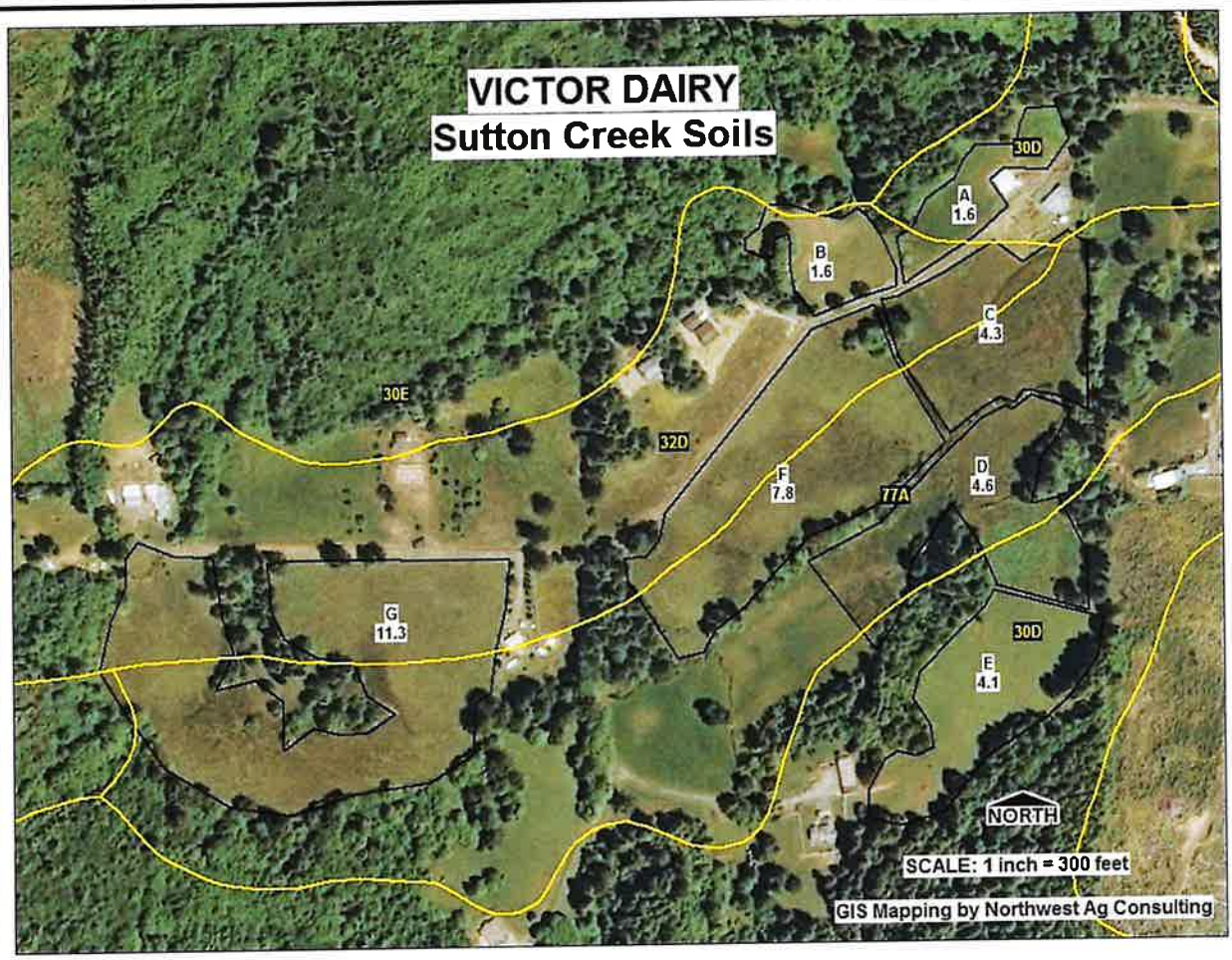
Crop- Grass Pasture
Region- Coastal

Total Seasonal Evapotranspiration-	23.04 Inches
Peak Evapotranspiration Rate-	0.13 Inches/Day
Maximum Allowed Depletion-	50 %
Critical Moisture Deficit Period-	Jul



Soil Maps for Victor Dairy

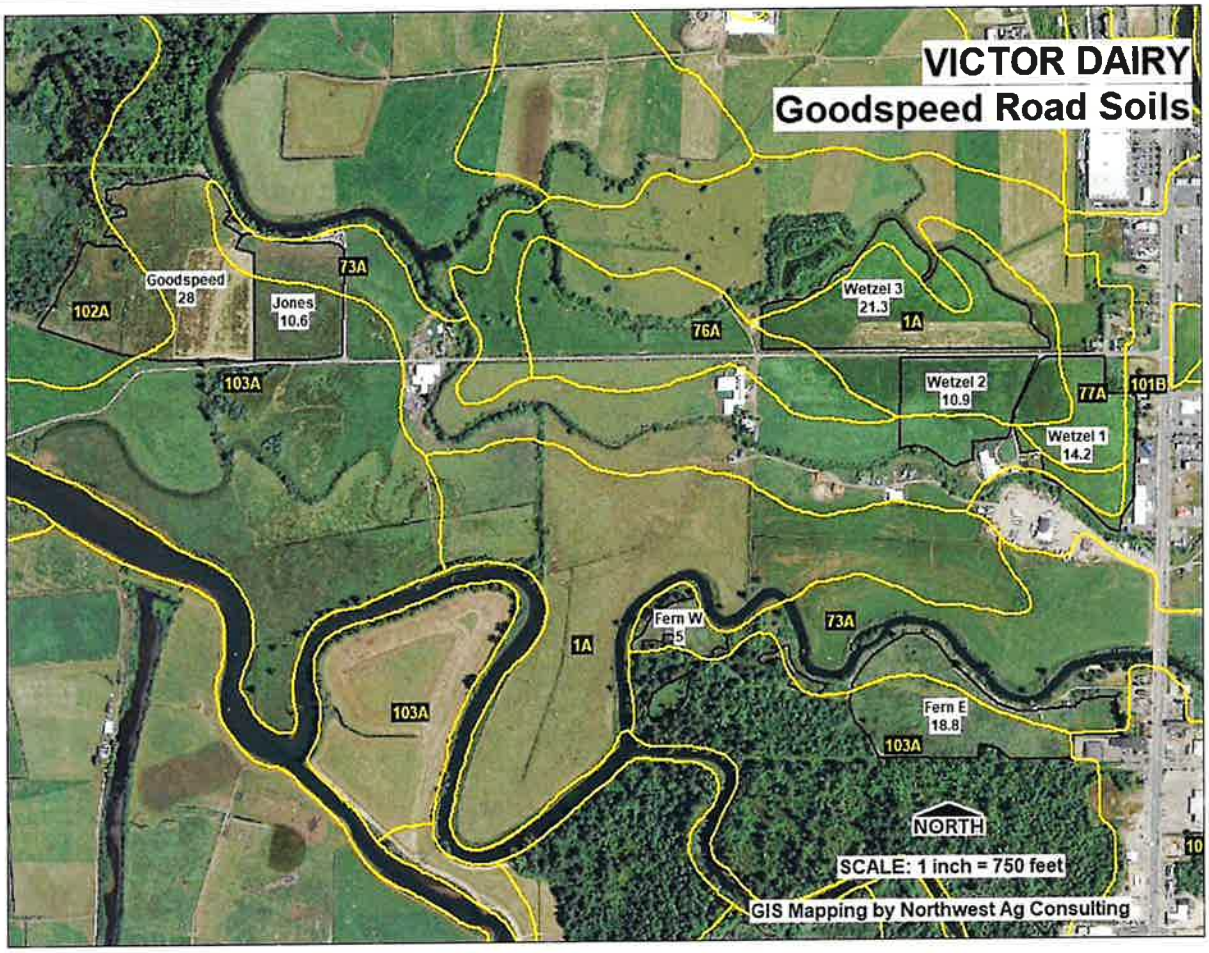
Soils Map #3



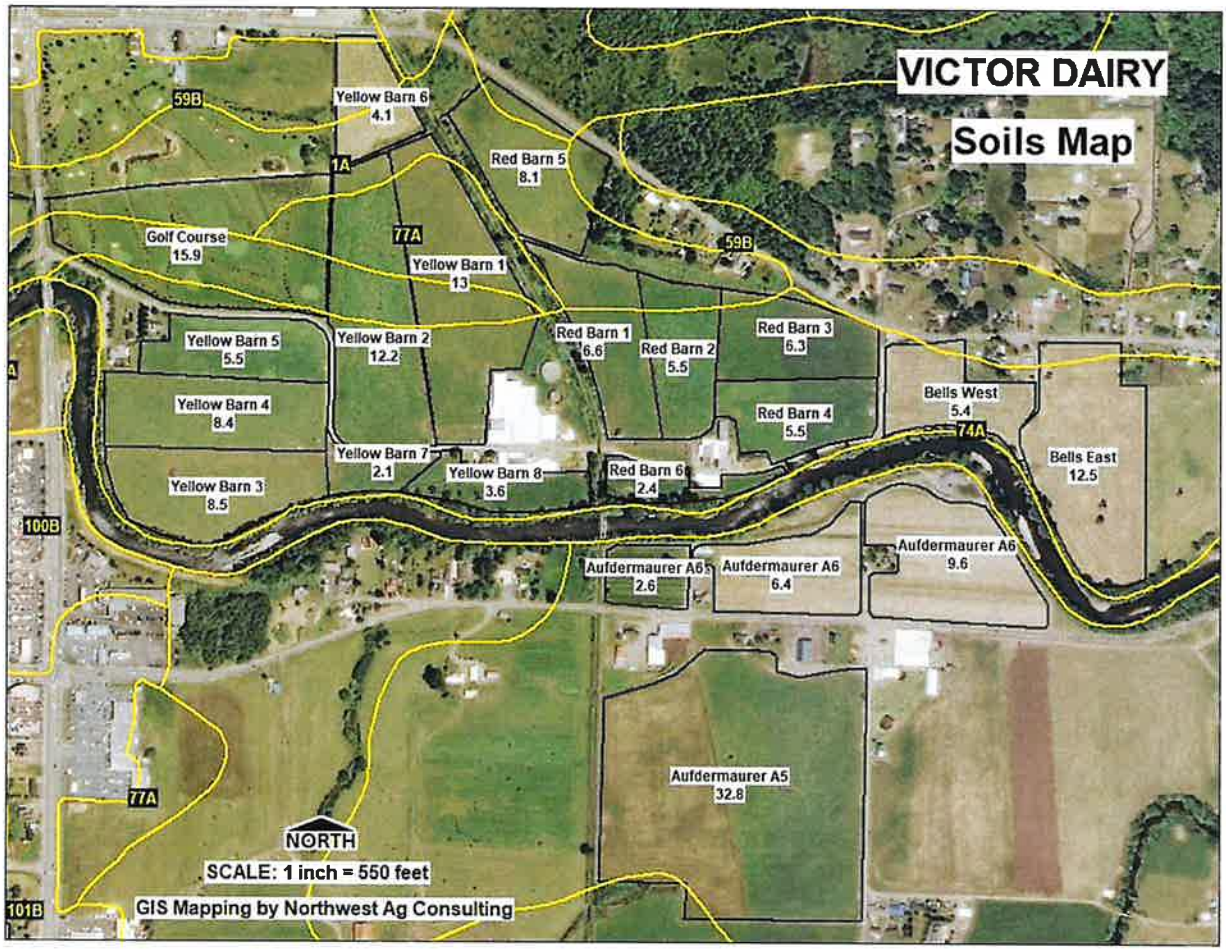
Soils Map #4


VICTOR DAIRY
Crawford Fields & Soils
81B
Crawford N
14.9
128B
45B
170A
Crawford S
13.7
170B
NORTH
SCALE: 1 inch = 250 feet
GIS Mapping by Northwest Ag Consulting

Soils Map #7


VICTOR DAIRY
Goodspeed Road Soils
Goodspeed 28
Jones 10.6
102A
73A
103A
76A
Wetzel 3 21.3
1A
Wetzel 2 10.9
77A
101B
Wetzel 1 14.2
Fern W 5
73A
1A
103A
Fern E 18.8
103A
NORTH
SCALE: 1 inch = 750 feet
GIS Mapping by Northwest Ag Consulting

Soils Map #8


VICTOR DAIRY
Soils Map
59B
Yellow Barn 6
4.1
1A
Red Barn 5
8.1
77A
Golf Course
15.9
Yellow Barn 1
13
59B
Yellow Barn 5
5.5
Yellow Barn 2
12.2
Red Barn 1
6.6
Red Barn 2
5.5
Red Barn 3
6.3
Yellow Barn 4
8.4
Red Barn 4
5.5
Bells West
5.4
74A
Yellow Barn 7
2.1
Yellow Barn 8
3.6
Red Barn 6
2.4
Bells East
12.5
Yellow Barn 3
8.5
100B
Aufdermaurer A6
9.6
Aufdermaurer A65
2.6
Aufdermaurer A6
6.4
Aufdermaurer A5
32.8
77A
NORTH
SCALE: 1 inch = 550 feet
101B
GIS Mapping by Northwest Ag Consulting

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 dominatedby one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomicclassification 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, everymap 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 soilshave properties similarto those of the dominantsoil or soilsin 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 affectuse 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 patternwas 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 resourceplans. If intensiveuse 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 surfacelayer, 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, asociations, 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 soilsor miscellaneous areasare 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 areasthat are shownas one unit on the maps. Becauseof 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 bemade up of only one of the major soilsor 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 othersoil reports, whichgive properties of the soilsand 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 basedon 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

ar-sa"="">

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)

17B—Chitwood-Hebo complex, 0 to 5 percent slopes

Map Unit Setting
National map unit symbol: 27w0
Elevation: 20 to 300 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
Chitwood and similar soils: 50 percent
Hebo and similar soils: 35 percent
Estimates are basedon observations, descriptions, and transects of the mapunit.

Description of Chitwood

Setting
Landform: Stream terraces, fluviomarine terraces
Landform position (three-dimensional): Riser, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluviumand/or fluviomarine depositsderived from sedimentary rock

Typical profile
Ap - 0 to 7 inches: medial silt loam
A - 7 to 11 inches: silt loam
BA - 11 to 19 inches: silty clay loam
Bw - 19 to 29 inches: silty clay
BC - 29 to 60 inches: silty clay loam

Properties and qualities
Slope: 0 to 5 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 0.20 in/hr)

Depth to water table: About 11 to 19 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 12.4 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Other vegetative classification: Somewhat Poorly Drained
(G004AY017OR), Sitka spruce/salmonberry-wet (903)

Description of Hebo

Setting

Landform: Depressions on stream terraces, drainageways on fluviomarine terraces
Landform position (three-dimensional): Tread, riser
Down-slope shape: Concave, linear
Across-slope shape: Linear
Parent material: Mixed alluviumand/or fluviomarine depositsderived from sedimentary rock

Typical profile

Ap - 0 to 4 inches: silty clay loam
BA - 4 to 10 inches: silty clay
Bg1 - 10 to 18 inches: clay
Bg2 - 18 to 26 inches: clay
BCg - 26 to 35 inches: silty clay
2Cg - 35 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limitinglayer to transmitwater (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 4 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water storage in profile: High (about 10.6 inches)

Interpretive groups

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

32D—Munsoncreek-Flowerpot complex, 5 to 30 percent slopes

Map Unit Setting

National map unit symbol: 27zw
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

Munsoncreek and similar soils: 65 percent
Flowerpot and similar soils: 20 percent
Estimates are basedon observations, descriptions, and transects of the mapunit.

Description of Munsoncreek

Setting

Landform: Mountain slopes, hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Mountainbase, mountaintop, base slope, interfluve
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Colluvium and residuum derived from sedimentary rock

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 10 inches: medial silt loam
AB - 10 to 18 inches: silty clay loam
Bw1 - 18 to 28 inches: silty clay loam
Bw2 - 28 to 41 inches: silty clay loam
Bw3 - 41 to 58 inches: extremely paragravelly silty clay loam
Cr - 58 to 68 inches: weathered bedrock

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Other vegetative classification: Sitka spruce/salmonberry-wet (903)

Description of Flowerpot

Setting

Landform: Mountain slopes, hillslopes
Landform position (two-dimensional): Toeslope, summit
Landform position (three-dimensional): Mountainbase, mountaintop, interfluve, base slope
Down-slope shape: Concave
Across-slope shape: Linear, concave
Parent material: Colluvium and residuum derived from sedimentary rock

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 8 inches: medial silty clay loam
A2 - 8 to 14 inches: silty clay loam
AB - 14 to 22 inches: silty clay loam
Bw - 22 to 30 inches: silty clay loam
Bg - 30 to 52 inches: silty clay loam
BC - 52 to 60 inches: silty clay loam

Properties and qualities
Slope: 5 to 30 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 22 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 13.1 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C/D
Other vegetative classification: Sitka spruce/salmonberry-wet (903)

59B—Chitwood-Knappa medial silt loams, 0 to 7 percent slopes

Map Unit Setting
National map unit symbol: 27wh
Elevation: 20 to 300 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
Chitwood and similar soils: 45 percent
Knappa and similar soils: 40 percent
Minor components: 6 percent
Estimates are basedon observations, descriptions, and transects of the mapunit.

Description of Chitwood

Setting
Landform: Stream terraces, fluviomarine terraces
Landform position (three-dimensional): Riser, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluviumand/or fluviomarine depositsderived from sedimentary rock

Typical profile
Ap - 0 to 7 inches: medial silt loam
A - 7 to 11 inches: silt loam
BA - 11 to 19 inches: silty clay loam
Bw - 19 to 29 inches: silty clay
BC - 29 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 7 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 0.20 in/hr)

Depth to water table: About 11 to 19 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 12.4 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Other vegetative classification: Somewhat Poorly Drained
(G004AY017OR), Sitka spruce/salmonberry-wet (903)

Description of Knappa

Setting
Landform: Stream terraces, fluviomarine terraces
Landform position (three-dimensional): Riser, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluviumand/or fluviomarine depositsderived from sedimentary rock

Typical profile
Ap - 0 to 9 inches: medial silt loam
A - 9 to 20 inches: silt loam
Bw1 - 20 to 25 inches: silty clay loam
Bw2 - 25 to 45 inches: silty clay loam
Bw3 - 45 to 60 inches: silty 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 (0.57 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 13.8 inches)

Interpretive groups
Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Other vegetative classification: Well Drained <15% Slopes
(G004AY014OR), Sitka spruce/salmonberry-wet (903)

Minor Components

Hebo

Percent of map unit: 6 percent
Landform: Depressions on fluviomarine terraces
Other vegetative classification: Poorly Drained (G004AY018OR)

73A—Nehalem silt loam, 0 to 3 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 27z4
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, frequent flooding, and similar soils: 75 percent
Minor components: 8 percent
Estimates are basedon observations, descriptions, and transects of the mapunit.

Description of Nehalem, Frequent 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: 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

Other vegetative classification: Well Drained <15% Slopes (G004AY014OR), Sitka spruce/salmonberry-wet (903)

Minor Components

Brenner
Percent of map unit: 8 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G004AY018OR)

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 basedon 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)

Minor Components

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

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 basedon 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)

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)

100B—Urbanland-Udorthents complex, 0 to 7 percent slopes

Map Unit Setting
National map unit symbol: 27wl
Elevation: 10 to 50 feet
Mean annual precipitation: 80 to 110 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 120 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition
Urban land: 65 percent
Udorthents and similar soils: 25 percent
Minor components: 10 percent
Estimates are basedon observations, descriptions, and transects of the mapunit.

Description of Urban Land

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8

Description of Udorthents

Setting
Landform: Flood plains, stream terraces
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous and sedimentary rock and/or colluvium derived from igneous rock and human transported materials

Typical profile
A - 0 to 2 inches: gravelly sandy loam
C - 2 to 60 inches: very gravelly sandy loam

Properties and qualities
Slope: 0 to 7 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.20 to 19.98 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 3.6 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Other vegetative classification: Sitka spruce/dry non-forest (971)

Minor Components

Aquepts
Percent of map unit: 10 percent
Landform: Depressions on stream terraces

115A—Aquepts, 0 to 1 percent slopes

Map Unit Setting
National map unit symbol: 27wn
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: Not prime farmland

Map Unit Composition
Aquepts and similar soils: 85 percent
Estimates are basedon observations, descriptions, and transects of the mapunit.

Description of Aquepts

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

Typical profile
A - 0 to 3 inches: mucky silty clay loam
Bw - 3 to 9 inches: silty clay loam
Bg - 9 to 20 inches: silty clay loam
Cg - 20 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: Poorly 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: About 0 to 9 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): 5w
Hydrologic Soil Group: C/D

Other vegetative classification: Sitka spruce/salmonberry-wet (903)

W—Water

Map Unit Composition

Water: 100 percent

Estimates are basedon observations, descriptions, and transects of the mapunit.

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 basedon 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)

73A—Nehalem silt loam, 0 to 3 percent slopes, frequently flooded

Map Unit Setting
National map unit symbol: 27z4
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, frequent flooding, and similar soils: 75 percent
Minor components: 8 percent
Estimates are basedon observations, descriptions, and transects of the mapunit.

Description of Nehalem, Frequent 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: 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
Other vegetative classification: Well Drained <15% Slopes (G004AY014OR), Sitka spruce/salmonberry-wet (903)

Minor Components

Brenner
Percent of map unit: 8 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Poorly Drained (G004AY018OR)

76A—Nestucca silt loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 27z7
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: 90 percent
Minor components: 5 percent
Estimates are basedon 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)

Minor Components

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

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 basedon 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)

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)

101B—Urbanland-Udorthents complex, 0 to 7 percent slopes, flooded

Map Unit Setting
National map unit symbol: 2813
Elevation: 10 to 50 feet
Mean annual precipitation: 80 to 110 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 120 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition
Urban land, flooded: 65 percent
Udorthents, flooded, and similar soils: 25 percent
Minor components: 10 percent
Estimates are basedon observations, descriptions, and transects of the mapunit.

Description of Urban Land, Flooded

Properties and qualities
Slope: 0 to 7 percent
Frequency of flooding: Occasional

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8

Description of Udorthents, Flooded

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 and/or colluvium derived from igneous rock and human transported materials

Typical profile
A - 0 to 2 inches: gravelly sandy loam
C - 2 to 60 inches: very gravelly sandy loam

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 high to very high (0.20 to 19.98 in/hr)

Depth to water table: About 14 to 41 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Other vegetative classification: Sitka spruce/wet non-forest (991)

Minor Components

Aquepts
Percent of map unit: 10 percent
Landform: Depressions on flood plains

102A—Fluvaquents-Histosols complex,0 to 1 percent slopes, diked

Map Unit Setting
National map unit symbol: 27zb
Elevation: 0 to 10 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: Farmland of statewide importance

Map Unit Composition
Fluvaquents, diked, and similar soils: 60 percent
Histosols, diked, and similar soils: 35 percent
Minor components: 5 percent
Estimates are basedon observations, descriptions, and transects of the mapunit.

Description of Fluvaquents, Diked

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

Typical profile
A1 - 0 to 4 inches: mucky silt loam
A2 - 4 to 7 inches: mucky silt loam
Cg1 - 7 to 22 inches: silt loam
Cg2 - 22 to 25 inches: sandy loam
Cg3 - 25 to 45 inches: loam
Cg4 - 45 to 60 inches: very gravelly sandy loam

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: 30 to 60 inches to strongly contrasting textural stratification
Natural drainage class: Very poorly 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: About 0 to 4 inches
Frequency of flooding: Frequent

Frequency of ponding: Frequent
Salinity, maximum in profile: Very slightlysaline to moderately saline (2.0 to 8.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.1 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Other vegetative classification: Very Poorly Drained
(G004AY019OR), Sitka spruce/wet non-forest (991)

Description of Histosols, Diked

Setting
Landform: Tidal marshes
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Organic materials overlying alluvium or estuarine deposits; stratified organic materials and alluvium; organic materials throughout

Typical profile
Oe - 0 to 7 inches: mucky peat
Oa1 - 7 to 13 inches: muck
Oa2 - 13 to 20 inches: muck
2C1 - 20 to 32 inches: mucky silt loam
2C2 - 32 to 60 inches: mucky silty clay loam

ar-sa"="">

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 high to high (0.20 to 1.98 in/hr)
Depth to water table: About 0 to 7 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Salinity, maximum in profile: Very slightlysaline to moderately saline (2.0 to 8.0 mmhos/cm)
Available water storage in profile: Very high (about 17.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Other vegetative classification: Very Poorly Drained
(G004AY019OR), Sitka spruce/wet non-forest (991)

Minor Components

Coquille, diked

Percent of map unit: 5 percent
Landform: Tidal marshes
Other vegetative classification: Very Poorly Drained(G004AY019OR)

103A—Coquille silt loam, 0 to 1 percent slopes, diked

Map Unit Setting
National map unit symbol: 27zc
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: Farmland of statewide importance

Map Unit Composition
Coquille, diked, and similar soils: 85 percent
Minor components: 15 percent
Estimates are basedon observations, descriptions, and transects of the mapunit.

Description of Coquille, Diked

Setting
Landform: Tidal marshes
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: 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): 4w
Hydrologic Soil Group: C/D

Other vegetative classification: Very Poorly Drained (G004AY019OR), Sitka spruce/wet non-forest (991)

Minor Components

Histosols
Percent of map unit: 10 percent
Landform: Tidal marshes

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

30D—Templeton medial silt loam, 5 to 30 percent slopes

Map Unit Setting
National map unit symbol: 27y7
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
Templeton and similar soils: 85 percent
Estimates are basedon observations, descriptions, and transects of the mapunit.

Description of Templeton

Setting
Landform: Mountain slopes, hillslopes
Landform position (two-dimensional): Summit, footslope, toeslope
Landform position (three-dimensional): Mountainbase, mountaintop, base slope, interfluve
Down-slope shape: Linear, concave, convex
Across-slope shape: Linear, convex, concave
Parent material: Colluvium and residuum derived from sedimentary rock

Typical profile
Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 15 inches: medial silt loam
Bw1 - 15 to 28 inches: silty clay loam
Bw2 - 28 to 43 inches: silty clay loam
Bw3 - 43 to 54 inches: silty clay loam
Bw4 - 54 to 59 inches: paragravelly silty clay loam
Cr - 59 to 69 inches: weathered bedrock

ar-sa"="">

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
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 14.9 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)

30E—Templeton-Ecola medial silt loams, 30 to 60 percent slopes

Map Unit Setting
National map unit symbol: 27y8
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
Templeton and similar soils: 60 percent
Ecola and similar soils: 20 percent
Estimates are basedon observations, descriptions, and transects of the mapunit.

Description of Templeton

Setting
Landform: Mountain slopes, hillslopes
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Lower third of mountainflank, center third of mountainflank, side slope

Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Parent material: Colluvium and residuum derived from sedimentary rock

Typical profile
Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 15 inches: medial silt loam
Bw1 - 15 to 28 inches: silty clay loam
Bw2 - 28 to 43 inches: silty clay loam
Bw3 - 43 to 54 inches: silty clay loam
Bw4 - 54 to 59 inches: paragravelly silty clay loam
Cr - 59 to 69 inches: weathered bedrock

Properties and qualities

Slope: 30 to 60 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
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 14.9 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)

Description of Ecola

Setting
Landform: Mountain slopes, hillslopes
Landform position (two-dimensional): Backslope, footslope, shoulder
Landform position (three-dimensional): Lower third of mountainflank, upper third of mountainflank, nose slope

Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Colluvium derived from sedimentary rock

Typical profile
Oi - 0 to 3 inches: slightly decomposed plant material
A - 3 to 12 inches: medial silt loam
AB - 12 to 19 inches: paragravelly silt loam
Bw - 19 to 36 inches: very paragravelly silty clay loam
Cr - 36 to 46 inches: weathered bedrock

Properties and qualities
Slope: 30 to 60 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
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: High (about 9.5 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Other vegetative classification: Sitka spruce/oxalis, swordfern-moist(902)

ar-sa"="">

32D—Munsoncreek-Flowerpot complex, 5 to 30 percent slopes

Map Unit Setting
National map unit symbol: 27zw
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
Munsoncreek and similar soils: 65 percent
Flowerpot and similar soils: 20 percent
Estimates are basedon observations, descriptions, and transects of the mapunit.

Description of Munsoncreek

Setting
Landform: Mountain slopes, hillslopes
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Mountainbase, mountaintop, base slope, interfluve
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Colluvium and residuum derived from sedimentary rock

Typical profile
Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 10 inches: medial silt loam
AB - 10 to 18 inches: silty clay loam
Bw1 - 18 to 28 inches: silty clay loam
Bw2 - 28 to 41 inches: silty clay loam
Bw3 - 41 to 58 inches: extremely paragravelly silty clay loam
Cr - 58 to 68 inches: weathered bedrock

Properties and qualities
Slope: 5 to 30 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Other vegetative classification: Sitka spruce/salmonberry-wet (903)

Description of Flowerpot

Setting
Landform: Mountain slopes, hillslopes
Landform position (two-dimensional): Toeslope, summit
Landform position (three-dimensional): Mountainbase, mountaintop, interfluve, base slope
Down-slope shape: Concave
Across-slope shape: Linear, concave
Parent material: Colluvium and residuum derived from sedimentary rock

Typical profile
Oi - 0 to 1 inches: slightly decomposed plant material
A1 - 1 to 8 inches: medial silty clay loam
A2 - 8 to 14 inches: silty clay loam
AB - 14 to 22 inches: silty clay loam
Bw - 22 to 30 inches: silty clay loam
Bg - 30 to 52 inches: silty clay loam
BC - 52 to 60 inches: silty clay loam

Properties and qualities
Slope: 5 to 30 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 22 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 13.1 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C/D
Other vegetative classification: Sitka spruce/salmonberry-wet (903)

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 basedon 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)

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)

115A—Aquepts, 0 to 1 percent slopes

Map Unit Setting
National map unit symbol: 27wn
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: Not prime farmland

Map Unit Composition
Aquepts and similar soils: 85 percent
Estimates are basedon observations, descriptions, and transects of the mapunit.

Description of Aquepts

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

Typical profile
A - 0 to 3 inches: mucky silty clay loam
Bw - 3 to 9 inches: silty clay loam
Bg - 9 to 20 inches: silty clay loam
Cg - 20 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: Poorly 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: About 0 to 9 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): 5w
Hydrologic Soil Group: C/D
Other vegetative classification: Sitka spruce/salmonberry-wet (903)

Data Source Information

Soil Survey Area:	Tillamook County, Oregon
Survey Area Data:	Version 7, Sep 18, 2015

Nitrate Leaching Potential (WA)---Tillamook County, Oregon Victor Dairy

These interpretations are designed to evaluate the potential for nitrate-nitrogen to be transmitted through the soil profile below the root zone by percolating water for both nonirrigated and irrigated conditions. Leaching nitrates have the potential to contaminate shallow and deep aquifers used for drinking water. The ratings are based on inherent soil and climate properties that affect nitrate leaching, and do not account for management practices such as nitrogen fertilizer application rates and timing, crop rotation, or irrigation water management. The following soil and climate factors are used in the interpretation criteria: 1. Mean annual precipitation minus potential evapotranspiration - this factor provides an estimate of the amount of water that is available to move through the soil profile on an annual basis. Potential evaporation is estimated from mean annual air temperature, using an algorithm developed by the National Soil Survey Center, using the Hamon potential evapotranspiration method. 2. Water travel time through the entire soil profile - this factor uses the saturated hydraulic conductivity (Ksat) and thickness of each soil horizon, to estimate the number of hours that would be required for a given volume of water to move through the entire soil profile. One advantage of this method for accounting for the rate of water movement is that the properties and thickness of each soil horizon are accounted for, rather than using an average saturated hydraulic conductivity for the entire profile. This method accounts for subtle differences between soils in texture, structure, horizon thickness, and depth to waterrestricting layers. 3. Available water capacity - this factor accounts for the cumulative amount of water available to plants that the entire soil profile can hold at field capacity to a depth of 150 cm. The more water the soil profile can hold, the less water is available for deep leaching. 4. Depth and duration of water table - this factor uses a water table index based on the minimum average depth to a water table, and the number of months that the water table is present during the months of April through October. It is used to account for the loss of nitrates to the atmosphere as nitrous oxide or nitrogen gas due to denitrification under anaerobic conditions caused by water saturation. The higher the water table and the longer it's duration, the larger the quantity of nitrates that would potentially be lost to the atmosphere, and therefore not be available for deep leaching. 5. Slope gradient adjusted for hydrologic soil group - the steeper the slope gradient, the higher the potential surface runoff, resulting in less water available to move through the soil profile. The nonirrigated and irrigated interpretations use the same factors in the criteria, but they are weighted differently. For example, the Mean Annual Precipitation minus Potential Evapotranspiration factor is weighted more heavily in the nonirrigated interpretation, because supplemental

water is applied in the irrigated condition, and precipitation is less important.

The ratings indicate the potential for nitrate leaching below the root zone, based on inherent soil and climate properties. A Low rating indicates a low potential for nitrates to leach below the root zone. A High rating indicates a high potential for nitrates to leach below the root zone. The Moderate and Moderately high rating indicate intermediate potentials.

Report—Nitrate Leaching Potential (WA)

Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential for nitrate leaching for all factors, except the "denitrification due to saturation" and "slope" factors. For these factors, the greater the value, the lower the potential for nitrate leaching.

Nitrate Leaching Potential (WA)---Tillamook County, Oregon Victor Dairy

Nitrate Leaching Potential (WA)–Tillamook County, Oregon					
Map symbol and soil name	Pct. of map unit	Nitrate leaching potential, irrigated (WA)		Nitrate leaching potential, nonirrigated (WA)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
1A—Brenner silt loam, 0 to 1 percent slopes					
Brenner	85	Moderately high	0.60	Low	0.20
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50
		Water travel time	0.38	Water travel time	0.38
17B—Chitwood-Hebo complex, 0 to 5 percent slopes					
Chitwood	50	Moderately high	0.60	Low	0.10
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50
Hebo	35	Moderately high	0.60	Low	0.10
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50

Nitrate Leaching Potential (WA)–Tillamook County, Oregon					
Map symbol and soil name	Pct. of map unit	Nitrate leaching potential, irrigated (WA)		Nitrate leaching potential, nonirrigated (WA)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
32D—Munsoncreek-Flowerpot complex, 5 to 30 percent slopes					
Munsoncreek	65	Moderately high	0.64	Moderately high	0.57
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Water travel time	0.16	Water travel time	0.16
		Slope	0.07	Slope	0.07
Flowerpot	20	Moderately high	0.60	Moderately high	0.52
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Slope	0.08	Slope	0.08
59B—Chitwood-Knappa medial silt loams, 0 to 7 percent slopes					
Chitwood	45	Moderately high	0.60	Low	0.10
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50
Knappa	40	High	1.00	High	0.80
		Water travel time	0.82	Water quantity available for leaching	1.00
		Water quantity from precipitation available for leaching	0.60	Water travel time	0.82
73A—Nehalem silt loam, 0 to 3 percent slopes, frequently flooded					
Nehalem, frequent flooding	75	High	1.00	High	0.81
		Water travel time	0.82	Water quantity available for leaching	1.00
		Water quantity from precipitation available for leaching	0.60	Water travel time	0.82

SOIL AND RISK

Nitrate Leaching Potential (WA)–Tillamook County, Oregon					
Map symbol and soil name	Pct. of map unit	Nitrate leaching potential, irrigated (WA)		Nitrate leaching potential, nonirrigated (WA)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
74A—Nehalem silt loam, 0 to 3 percent slopes					
Nehalem, occasional flooding	80	High	1.00	High	0.91
		Water travel time	0.82	Water quantity available for leaching	1.00
		Water quantity from precipitation available for leaching	0.60	Water travel time	0.82
77A—Nestucca-Brenner silt loams, 0 to 3 percent slopes					
Nestucca	55	Moderately high	0.60	Low	0.20
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50
		Water travel time	0.41	Water travel time	0.41
Brenner	40	Moderately high	0.60	Low	0.20
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50
		Water travel time	0.38	Water travel time	0.38
100B—Urban land-Udorthents complex, 0 to 7 percent slopes					
Urban land	65	Not rated		Not rated	
Udorthents	25	High	1.00	High	0.99
		Water travel time	1.00	Water quantity available for leaching	1.00
		Water holding capacity	0.99	Water travel time	1.00
		Water quantity from precipitation available for leaching	0.60	Water holding capacity	0.99

SOIL AND RISK

Nitrate Leaching Potential (WA)–Tillamook County, Oregon					
Map symbol and soil name	Pct. of map unit	Nitrate leaching potential, irrigated (WA)		Nitrate leaching potential, nonirrigated (WA)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
115A—Aquepts, 0 to 1 percent slopes					
Aquepts	85	Moderately high	0.60	Low	0.10
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50
		Water travel time	0.01	Water travel time	0.01
W—Water					
Water	100	Not rated		Not rated	

Data Source Information

Soil Survey Area: Tillamook County, Oregon
Survey Area Data: Version 10, Sep 18, 2018

Nitrate Leaching Potential (WA)---Tillamook County, Oregon Victor Dairy-Goodspeed-Jones-Wetzel fields.

Nitrate Leaching Potential (WA)–Tillamook County, Oregon					
Map symbol and soil name	Pct. of map unit	Nitrate leaching potential, irrigated (WA)		Nitrate leaching potential, nonirrigated (WA)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
1A—Brenner silt loam, 0 to 1 percent slopes					
Brenner	85	Moderately high	0.60	Low	0.20
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50
		Water travel time	0.38	Water travel time	0.38
73A—Nehalem silt loam, 0 to 3 percent slopes, frequently flooded					
Nehalem, frequent flooding	75	High	1.00	High	0.81
		Water travel time	0.82	Water quantity available for leaching	1.00
		Water quantity from precipitation available for leaching	0.60	Water travel time	0.82
76A—Nestucca silt loam, 0 to 3 percent slopes					
Nestucca	90	Moderately high	0.60	Low	0.20
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50
		Water travel time	0.41	Water travel time	0.41

Nitrate Leaching Potential (WA)–Tillamook County, Oregon					
Map symbol and soil name	Pct. of map unit	Nitrate leaching potential, irrigated (WA)		Nitrate leaching potential, nonirrigated (WA)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
77A—Nestucca-Brenner silt loams, 0 to 3 percent slopes					
Nestucca	55	Moderately high	0.60	Low	0.20
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50
		Water travel time	0.41	Water travel time	0.41
Brenner	40	Moderately high	0.60	Low	0.20
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50
		Water travel time	0.38	Water travel time	0.38
101B—Urban land-Udorthents complex, 0 to 7 percent slopes, flooded					
Urban land, flooded	65	Not rated		Not rated	
Udorthents, flooded	25	High	1.00	Moderate	0.50
		Water travel time	1.00	Water quantity available for leaching	1.00
		Water holding capacity	0.99	Water travel time	1.00
		Water quantity from precipitation available for leaching	0.60	Water holding capacity	0.99
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50

Nitrate Leaching Potential (WA)–Tillamook County, Oregon					
Map symbol and soil name	Pct. of map unit	Nitrate leaching potential, irrigated (WA)		Nitrate leaching potential, nonirrigated (WA)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
102A—Fluvaquents-Histosols complex, 0 to 1 percent slopes, diked					
Fluvaquents, diked	60	High	0.84	Moderate	0.37
		Water travel time	0.97	Water quantity available for leaching	1.00
		Water quantity from precipitation available for leaching	0.60	Water travel time	0.97
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50
		Water holding capacity	0.20	Water holding capacity	0.20
Histosols, diked	35	Moderately high	0.60	Low	0.01
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50
		Water travel time	0.44	Water travel time	0.44
		Anion exhange capacity	0.20	Anion exhange capacity	0.20
103A—Coquille silt loam, 0 to 1 percent slopes, diked					
Coquille, diked	85	Moderately high	0.60	Low	0.10
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50

Data Source Information

Soil Survey Area: Tillamook County, Oregon
Survey Area Data: Version 10, Sep 18, 2018

SOIL AND RISK

Nitrate Leaching Potential (WA)---Tillamook County, Oregon Victor Dairy-Crawford fields.

Nitrate Leaching Potential (WA)–Tillamook County, Oregon					
Map symbol and soil name	Pct. of map unit	Nitrate leaching potential, irrigated (WA)		Nitrate leaching potential, nonirrigated (WA)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
45B—Hebo silty clay loam, 0 to 5 percent slopes					
Hebo	80	Moderately high	0.60	Low	0.10
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50
81B—Quillamook complex, 0 to 7 percent slopes					
Quillamook, gravelly substratum	60	High	0.92	Moderately high	0.52
		Water travel time	0.89	Water quantity available for leaching	1.00
		Water quantity from precipitation available for leaching	0.60	Water travel time	0.89
		Anion exhange capacity	0.30	Anion exhange capacity	0.30
Quillamook	25	High	0.87	Moderately high	0.50
		Water travel time	0.82	Water quantity available for leaching	1.00
		Water quantity from precipitation available for leaching	0.60	Water travel time	0.82
		Anion exhange capacity	0.30	Anion exhange capacity	0.30

Nitrate Leaching Potential (WA)–Tillamook County, Oregon					
Map symbol and soil name	Pct. of map unit	Nitrate leaching potential, irrigated (WA)		Nitrate leaching potential, nonirrigated (WA)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
128B—Siletz-Wolfer medial silt loams, 0 to 7 percent slopes					
Siletz	45	Moderately high	0.73	Moderate	0.45
		Water travel time	0.61	Water quantity available for leaching	1.00
		Water quantity from precipitation available for leaching	0.60	Water travel time	0.61
		Anion exhange capacity	0.30	Anion exhange capacity	0.30
Wolfer	40	High	0.97	Moderately high	0.54
		Water travel time	0.96	Water quantity available for leaching	1.00
		Water quantity from precipitation available for leaching	0.60	Water travel time	0.96
		Anion exhange capacity	0.30	Anion exhange capacity	0.30
170A—Logsden silt loam, 0 to 3 percent slopes					
Logsden	85	High	1.00	High	0.77
		Water travel time	0.67	Water quantity available for leaching	1.00
		Water quantity from precipitation available for leaching	0.60	Water travel time	0.67
170B—Logsden-Nehalem silt loams, 0 to 5 percent slopes					
Logsden	50	High	1.00	High	0.77
		Water travel time	0.67	Water quantity available for leaching	1.00
		Water quantity from precipitation available for leaching	0.60	Water travel time	0.67
Nehalem, occasional flooding	40	High	1.00	High	0.81
		Water travel time	0.82	Water quantity available for leaching	1.00
		Water quantity from precipitation available for leaching	0.60	Water travel time	0.82

Data Source Information

Soil Survey Area: Tillamook County, Oregon
Survey Area Data: Version 10, Sep 18, 2018

Nitrate Leaching Potential (WA)---Tillamook County, Oregon Victor Dairy-Sutton fields.

Nitrate Leaching Potential (WA)–Tillamook County, Oregon					
Map symbol and soil name	Pct. of map unit	Nitrate leaching potential, irrigated (WA)		Nitrate leaching potential, nonirrigated (WA)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
30D—Templeton medial silt loam, 5 to 30 percent slopes					
Templeton	85	High	1.00	High	0.75
		Water travel time	0.83	Water quantity available for leaching	1.00
		Water quantity from precipitation available for leaching	0.60	Water travel time	0.83
		Slope	0.05	Slope	0.05
30E—Templeton-Ecola medial silt loams, 30 to 60 percent slopes					
Templeton	60	High	0.90	Moderately high	0.53
		Water travel time	0.83	Water quantity available for leaching	1.00
		Water quantity from precipitation available for leaching	0.60	Water travel time	0.83
		Slope	0.28	Slope	0.28
Ecola	20	High	1.00	Moderately high	0.61
		Water travel time	0.99	Water quantity available for leaching	1.00
		Water quantity from precipitation available for leaching	0.60	Water travel time	0.99
		Water holding capacity	0.44	Water holding capacity	0.44
		Slope	0.30	Slope	0.30

SOIL AND RISK

Nitrate Leaching Potential (WA)–Tillamook County, Oregon					
Map symbol and soil name	Pct. of map unit	Nitrate leaching potential, irrigated (WA)		Nitrate leaching potential, nonirrigated (WA)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
32D—Munsoncreek-Flowerpot complex, 5 to 30 percent slopes					
Munsoncreek	65	Moderately high	0.64	Moderately high	0.57
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Water travel time	0.16	Water travel time	0.16
		Slope	0.07	Slope	0.07
Flowerpot	20	Moderately high	0.60	Moderately high	0.52
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Slope	0.08	Slope	0.08
77A—Nestucca-Brenner silt loams, 0 to 3 percent slopes					
Nestucca	55	Moderately high	0.60	Low	0.20
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50
		Water travel time	0.41	Water travel time	0.41
Brenner	40	Moderately high	0.60	Low	0.20
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50
		Water travel time	0.38	Water travel time	0.38
115A—Aquepts, 0 to 1 percent slopes					
Aquepts	85	Moderately high	0.60	Low	0.10
		Water quantity from precipitation available for leaching	0.60	Water quantity available for leaching	1.00
		Denitrification due to saturation	0.50	Denitrification due to saturation	0.50
		Water travel time	0.01	Water travel time	0.01

Data Source Information

Soil Survey Area: Tillamook County, Oregon
Survey Area Data: Version 10, Sep 18, 2018

Phosphorus Index Report

Victor Dairy - 2018

Tillamook

Field	Acres	Soil	Soil Test Date	Bray P (ppm)	Olsen (ppm)	K (ppm)	pH	TFS	SFS	Score	Rating
Bells East	12.5	74A, Nehalem	09/15/2017	22.0		415.0	6.0	4.75	10.04	14.75	Low
Bell West	5.4	74A, Nehalem	10/07/2018	22.0		624.0	5.9	4.75	10.42	15.17	Low
Red Barn 4	5.5	74A, Nehalem	09/15/2017	148.0		1310.0	5.7	4.75	18.80	23.55	Low
Red Barn 3	6.3	74A, Nehalem	09/15/2017	92.0		1062.0	5.6	4.75	13.20	17.95	Low
Red Barn 2	5.5	74A, Nehalem	09/15/2017	100.0		1051.0	5.7	4.75	14.00	18.75	Low
Red Barn 1	6.6	74A, Nehalem	09/15/2017	81.0		1043.0	5.7	4.75	12.96	17.71	Low
Red Barn 5	8.1	1A, Brenner	09/15/2017	20.0		543.0	5.6	4.75	8.00	12.75	Low
Red Barn 6	2.4	74A, Nehalem	09/15/2017	47.0		867.0	5.9	4.75	8.70	13.45	Low
Yellow Barn 8	3.6	74A, Nehalem	10/17/2018	47.0		867.0	5.9	4.75	8.70	13.45	Low
Yellow Barn 7	2.1	74A, Nehalem	10/07/2018	47.0		867.0	5.9	4.75	8.70	13.45	Low
Yellow Barn 1	13.0	74A, Nehalem	10/07/2018	108.0		1110.0	5.7	4.75	14.80	19.55	Low
Yellow Barn 6	2.4	74A, Nehalem	10/07/2018	108.0		1110.0	5.7	4.75	16.28	21.03	Low
Yellow Barn 2	12.2	74A, Nehalem	10/07/2018	108.0		1110.0	5.7	4.75	14.80	19.55	Low
Yellow Barn 3	8.5	74A, Nehalem	10/07/2018	107.0		1125.0	5.8	4.75	14.70	19.45	Low
Yellow Barn 4	8.4	74A, Nehalem	10/07/2018	107.0		1125.0	5.8	4.75	14.70	19.45	Low
Yellow Barn 5	5.5	74A, Nehalem	10/07/2018	107.0		1125.0	5.8	4.75	14.70	19.45	Low
Wetzel 3	21.3	1A, Brenner	10/07/2018	15.0		320.0	5.7	4.75	9.06	13.81	Low
Wetzel 1	14.2	77A, Nestucca	10/07/2018	32.0		497.0	5.6	7.25	10.64	17.89	Low
Wetzel 2	10.9	1A, Brenner	10/07/2018	32.0		497.0	5.6	4.75	9.70	14.45	Low
Fern East	18.8	73A, Nehalem	10/07/2018	10.0		281.0	5.5	6.25	9.46	15.71	Low
Fern West	4.9	73A, Nehalem	10/07/2018	4.0		437.0	5.7	6.25	8.00	14.25	Low
Jones	10.6	103A, Coquille	10/07/2018	13.0		431.0	5.4	4.75	9.62	14.37	Low
Goodspeed 1	14.0	103A, Coquille	10/07/2018	11.0		440.0	4.9	4.75	8.20	12.95	Low
Goodspeed 2	7.0	103A, Coquille	10/07/2018	11.0		440.0	4.9	4.75	8.14	12.89	Low
Goodspeed 3	7.0	102A,	10/07/2018	11.0		440.0	4.9	4.75	8.00	12.75	Low
Sutton G	11.3	77A, Nestucca	09/15/2017	6.0		210.0	4.6	7.25	8.00	15.25	Low
Sutton F	7.8	77A, Nestucca	09/15/2017	7.0		269.0	4.37	7.25	8.00	15.25	Low

Field	Acres	Soil	Soil Test Date	Bray P (ppm)	Olsen (ppm)	K (ppm)	pH	TFS	SFS	Score	Rating
Sutton C	4.3	77A, Nestucca	09/15/2017	7.0		290.0	4.5	7.25	8.00	15.25	Low
Crawford N	14.9	81B,	09/15/2017	9.0		493.0	5.2	4.75	8.00	12.75	Low
Crawford S	13.7	170A, Logsden	09/15/2017	23.0		761.0	5.4	4.00	9.44	13.44	Low
Sutton E&D	8.7	77A, Nestucca	09/15/2017	7.0		97.0	4.4	7.25	8.00	15.25	Low
Golf Course 1	14.0	73A, Nehalem	10/07/2018	108.0		1110.0	5.7	6.25	13.35	15.6	Low
Aufdermaurer A6	18.6	74A, Nehalem	09/15/2017	148.0		1310.0	5.7	4.75	15.06	19.81	Low
Aufdermaurer A5	32.8	74A, Nehalem	09/17/2017	148.0		1310.0	5.7	4.75	18.95	23.71	Low

PI Interpretations

P-Index Rating	Interpretation for Oregon	Recommended Nutrient Limitation
West PI Score<=25 or East PI Score<=100	The site has a LOW potential for P movement from the site. If farming practices are maintained at current levels, the probability of an adverse impact to surface water resources from P losses from this site are low.Phosphorus can be applied at rates greater than crop requirement	Nitrogen
West PI Score 25.1 to 50 or East PI Score 100.1 to 400	The site has a MEDIUM potential for P movement from the site. The probability for an adverse impact to surface water resources is greater than that from a LOW vulnerability rated site. Some remedial action should be taken to lessen the probability of P movement. Phosphorus can be applied not to exceed the crop requirement rate.	Phosphorus
West PI Score 50.1 to 75 or East PI Score 400.1 to 600	The site has a HIGH potential for P movement from the site. There is a high probability for an adverse impact to surface water resources unless action is taken to reduce the risk of P movement and probable water quality degradation. Phosphorus can be applied not to exceed the crop removal rate if the following requirements are met: A soil phosphorus drawdown strategy has been implemented, and A site assessment for nutrients and soil loss has been conducted to determine if mitigation practices are required to protect water quality.	Phosphorus
West PI Score >75 or East PI Score >600	ZERO OUT- The environmental threshold above which the risk of P loss from a field is too great to warrant the application of P for plant production.	No Manure

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	Tract #	Field name
Victor Dairy		Crawford N

Location	Soil	T value, t/ac/yr	Slope length (horiz), ft	Avg. slope steepness, %
USA\Oregon\Tillamook County\OR_Tillamook_R80-90	Tillamook County, Oregon\81B Quillamook complex, 0 to 7 percent slopes\Quillamook medial silt loam 60%	4.0	900	7.00

Alternatives:

Description	Base management	Contouring	Strips / barriers	Diversion/terrace, sediment basin
Erosion on Grass Pasture	CMZ 71\c.Other Local Mgt Records\Grass Haylage, yr1 fall plant; manure appl., Z71	a. rows up-and-down hill	(none)	(none)
Erosion on Corn Silage	CMZ 71\a.Single Year/Single Crop Templates\Corn, silage; clean till, spr. mb plow, Z71	a. rows up-and-down hill	(none)	(none)

Alternatives Results:

Description	Cons. plan. soil loss	Annual total biomass removal, lb/ac	Soil conditioning index (SCI)	SCI OM subfactor	SCI FO subfactor	SCI ER subfactor	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	4.22	3500	0.40	1.3	0.060	-0.66	94.9	0	15	2000000	0
Erosion on Corn Silage	5.45	0	0.39	2.2	-0.69	-1.1	171	0	6.4	890000	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.

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	Tract #	Field name
Victor Dairy		Crawford S

Location	Soil	T value, t/ac/yr	Slope length (horiz), ft	Avg. slope steepness, %
USA\Oregon\Tillamook County\OR_Tillamook_R80-90	Tillamook County, Oregon\170A Logsden silt loam, 0 to 3 percent slopes\Logsden silt loam 85%	5.0	900	3.00

Alternatives:

Description	Base management	Contouring	Strips / barriers	Diversion/terrace, sediment basin
Erosion on Grass Pasture	CMZ 71\c.Other Local Mgt Records\Grass Haylage, yr1 fall plant; manure appl., Z71	a. rows up-and-down hill	(none)	(none)
Erosion on Corn Silage	CMZ 71\a.Single Year/Single Crop Templates\Corn, silage; clean till, spr. mb plow, Z71	a. rows up-and-down hill	(none)	(none)

Alternatives Results:

Description	Cons. plan. soil loss	Annual total biomass removal, lb/ac	Soil conditioning index (SCI)	SCI OM subfactor	SCI FO subfactor	SCI ER subfactor	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	1.44	3500	0.62	1.3	0.060	0.43	94.9	0	15	2000000	0
Erosion on Corn Silage	2.05	0	0.66	2.2	-0.69	0.19	171	0	6.4	890000	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.

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	*Tract #*	*Field name*
Victor Dairy		**Fern East, Fern West, Golf Course 1**

Location	*Soil*	*T value, t/ac/yr*	*Slope length (horiz), ft*	*Avg. slope steepness, %*
USA\Oregon\Tillamook County\OR_Tillamook_R80-90	Tillamook County, Oregon\73A Nehalem silt loam, 0 to 3 percent slopes, frequently flooded\Nehalem silt loam 75%	5.0	900	3.00

Alternatives:

Description	*Base management*	*Contouring*	*Strips / barriers*	*Diversion/terrace, sediment basin*
Erosion on Grass Pasture	CMZ 71\c.Other Local Mgt Records\Grass Haylage, yr1 fall plant; manure appl., Z71	a. rows up-and-down hill	(none)	(none)
Erosion on Corn Silage	CMZ 71\a.Single Year/Single Crop Templates\Corn, silage; clean till, spr. mb plow, Z71	a. rows up-and-down hill	(none)	(none)

Alternatives Results:

Description	*Cons. plan. soil loss*	*Annual total biomass removal, lb/ac*	*Soil conditioning index (SCI)*	*SCI OM subfactor*	*SCI FO subfactor*	*SCI ER subfactor*	*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	1.48	3500	0.62	1.3	0.060	0.42	94.9	0	15	2000000	0
Erosion on Corn Silage	2.08	0	0.66	2.2	-0.69	0.18	171	0	6.4	890000	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.

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RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	Tract #	Field name
Victor Dairy		Goodspeed, Jones

Location	Soil	T value, t/ac/yr	Slope length (horiz), ft	Avg. slope steepness, %
Oregon\Tillamook County\OR_Tillamook_R80-90	103A Coquille silt loam, 0 to 1 percent slopes, diked\Coquille silt loam 85%	5.0	900	1.0

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 Hay/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)	0.68	0.71	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.

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	*Tract #*	*Field name*
Victor Dairy		**Red Barn 5, Witzel 2, 3**

Location	*Soil*	*T value, t/ac/yr*	*Slope length (horiz), ft*	*Avg. slope steepness, %*
Oregon\Tillamook County\OR_Tillamook_R80-90	1A Brenner silt loam, 0 to 1 percent slopes\Brenner silt loam 85%	5.0	900	1.0

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 Hay/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)	0.69	0.71	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.

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	Tract #	Field name
Victor Dairy		Sutton Creek A, E

Location	Soil	T value, t/ac/yr	Slope length (horiz), ft	Avg. slope steepness, %
Oregon\Tillamook County\OR_Tillamook_R80-90	30D Templeton medial silt loam, 5 to 30 percent slopes\Templeton slightly decomposed plant material 85%	4.0	570	30

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 Hay/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)	0	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.

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	*Tract #*	*Field name*
Victor Dairy		**Sutton Creek B**

Location	*Soil*	*T value, t/ac/yr*	*Slope length (horiz), ft*	*Avg. slope steepness, %*
Oregon\Tillamook County\OR_Tillamook_R80-90	32D Munsoncreek-Flowerpot complex, 5 to 30 percent slopes\Munsoncreek slightly decomposed plant material 65%	4.0	570	30

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 Hay/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)	0	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.

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	Tract #	Field name
Victor Dairy		Yellow Barn 1, Witzel 1, Sutton Creek C, D, F, G,

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 Hay/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.

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	Tract #	Field name
Victor Dairy		Yellow Barn 2, 3, 4, 5, 7,8, Red Barn 1, 2, 3, 4, 6, Bell's West, Bell's East, Aufdermaurer A5, A6

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 Hay/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.

USDA NRCS Natural Resources Conservation Service

RUSLE2 Worksheet Erosion Calculation Record

Info:

Owner name	Tract #	Field name
Victor Dairy		Yellow Barn 6

Location	Soil	T value, t/ac/yr	Slope length (horiz), ft	Avg. slope steepness, %
Oregon\Tillamook County\OR_Tillamook_R80-90	59B Chitwood-Knappa medial silt loams, 0 to 7 percent slopes\Chitwood medial silt loam 45%	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 Hay/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)	4.8	0.38	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.

#12100

ANIMAL WASTE MANAGEMENT PLAN

AMENDMENT/S TO THE ANIMAL WASTE MANAGEMENT PLAN 63275

Victor Dairy LLC — CONFINED ANIMAL FEEDING OPERATION

Chad Allen — CAFO OPERATOR'S NAME

2805 Old Latimer Rd Tillamook OR 97141 — FACILITY STREET ADDRESS, CITY, STATE, ZIP

503-801-1097 — PHONE NUMBER

On 5/18/12, Armando Macias — INSPECTOR'S NAME

of the Oregon Department of Agriculture discussed modifications to Animal Waste Management Plan (AWMP) # 05146 WPCF.

The following modifications were made to this AWMP:

1) Ken Bell property 19 AC - land Only no livestock

2) Bob Wetzel 50 AC land Only no livestock

3)

CONCLUSION:

The above amendment/s will be approved.

INSPECTOR'S SIGNATURE

5/18/12
Effective date

Date approved

OPERATOR'S SIGNATURE

copy sent to operator to Salem office

TFO Salem Producer

DATE : February 22, 2011
REPORT: S9328 M
CLIENT: VICTOR DAIRY
GROWER:
SAMPLED: CHAD ALLEN

MA 63275

Agri-Check
A Division of AgSource Cooperative Services
323 Sixth St. • P.O. Box 1350 • Umatilla, OR 97882
Ph: 541-922-4894 • 800-537-1129 • Fax: 541-922-5496

SOIL ANALYSIS REPORT

Lab No.	Depth Foot	pH	S.Salt mmhos	O. M. %	P ppm	K ppm	Ca meq	Mg meq	NITROGEN NO3 #/A	NITROGEN NH4 #/A	S ppm	B ppm	Zn ppm	Mn ppm	Cu ppm	Fe ppm	CEC meq	Na meq	Total Bases	Base Sat. %	SMP Buf.pH	MOISTURE Total %	MOISTURE Avail. Inches	TKN %	Cl ppm
FIELD: 1																									
3888	0-6"	6.4			54	1451	20.7	8.1	86	67									32.5		6.4				
FIELD: 2																									
3889	0-6"	6.2			61	1733	18.5	7.8	83	78									30.7		6.3				
FIELD: 3																									
3890	0-6"	6.2			110	2421	19.4	8.1	100	67									33.7		6.4				
FIELD: 4																									
3891	0-6"	6.2			81	2225	19.3	8.1	83	49									33.1		6.4				
FIELD: 5																									
3892	0-6"	6.2			14	511	21.9	5.8	41	28									29.0		6.2				

ANIMAL WASTE MANAGEMENT PLAN
MINIMUM REQUIRED ELEMENT/S

AMENDMENT/S TO THE ANIMAL WASTE MANAGEMENT PLAN

Victor Dairy, LLC — CONFINED ANIMAL FEEDING OPERATION
MA# 63275

Chad Allen — CAFO OPERATOR'S NAME

2805 OLD LATIMER RD. Tillamook OR 97141 — STREET ADDRESS, CITY, STATE, ZIP

503 801-1097 — PHONE NUMBER

On OCTOBER 21, 2010, Wym Matthews — INSPECTOR'S NAME

of the Oregon Department of Agriculture discussed modifications to Animal Waste Management Plan (AWMP) # 05146. with AREA I INSPECTOR, ARMANDO, MACIAS

The following modifications were made to this AWMP:

1) Change Date when manure storage facilities will be Ready for Winter, Wet season manure storage from October 1 of each year to November 1 of each year.

2)

3)

CONCLUSION:

X The above amendment/s will be/~~are~~ be accepted.

Approval 10-21-10
Effective 10-21-10

Wym Matthews
INSPECTOR'S SIGNATURE

OPERATOR'S SIGNATURE

George Allen Farm
George Allen
2805 Old Latimer Road
Tillamook, OR 97141
503/842/5734

A new Animal Waste Management Worksheet has been developed on 7/24/2007 for George Allen Farm. This worksheet was developed for a herd that is larger than the existing herd. The dairy operation is requesting a permit increase to 670 animals based on a herd population of 450 mature animals (1300 lbs) and 220 calves and heifers (100-1000 lbs).

The operation consists of four tracts: 3, 338, 616, and 362. There are approximately 249 acres of pasture/hay-land that receive manure. There are approximately 249 acres within the 100-year flood plain. The target yield is 8 tons of dry matter per acre per year on Tracts 3 and 338. The target yield for Tracts 616 and 362 is 6 tons of dry matter per acre per year. The pastures are in fair to good condition.

Liquid manure is transported to the fields by a pump and manure mainline and applied with a manure gun traveler, or by a 3,000-gallon tank wagon to tracts 616 and 362

Manure will be handled 100% liquids for the milking, heifers, and dry cows, and 100% solids for the calves. The liquid manure storage facilities at the dairy consist of five below ground tanks (20' x 11' x 5'), (35' x 7.5'), (45' x 7.5'), (32' x 8'), and (12' x 28' x 6.5') and two above ground liquid manure tanks (60' x 16') and (100' x 16'). The seven tanks at the dairy, in combination, can store the liquid waste produced by the above animals for 82 days.

There are two solid manure storage facilities at the dry cow barns: (40' x 65' x 6'), and (37.5' x 20' x 5'). The solid waste generated by the above animals can be stored for over 365 days.

Tract 3, fields 1-3 as well as Tract 338 fields 1 and 2 are irrigated. The calculated net irrigation rate for both tracts, all fields is 0.1 inches.

The animal confinement buildings have been guttered, down spouted and out-letted in an area free of manure. All conservation practices installed will be maintained and managed in accordance with the enclosed "CONSERVATION PRACTICE OPERATION AND MAINTENANCE PLAN".

Soils where manure is applied are Brenner, Coquille, and Nehalem. Brenner and Coquille are poorly drained soils. Nehalem is somewhat to well-drained soil.

Operator

7-25-07
Date

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 2.4

2513507
STATE: OREGON

CLIENT: George Allen Inc.

ASSISTED BY: ODA CHECKED BY: CMT

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

ANIMAL INVENTORY

Type of Animal	Number of Animals	Average Weight (lbs.)	Animal Units (1,000 lb.)	Milk Production in Pounds/Cow/Day= 60 — Nutrient Production (lbs./day/1000 lb. Animal Unit) N	P	K	(lbs./day) N	P	K	Manure CF/D/AU	Annual Days Confined	Annual Days Grazed
MILKER	400	1,300	520.0	0.53	0.09	0.30	276.23	46.80	156.09	1.47	195	170
MILKER (DRY)	50	1,300	65.0	0.36	0.05	0.23	23.40	3.25	14.95	1.10	148	217
HEIFERS (12-24 Months)	120	800	96.0	0.31	0.04	0.24	29.76	3.84	23.04	1.30	151	214
CALVES (1-12 Months)	100	400	40.0	0.31	0.04	0.24	12.40	1.60	9.60	1.30	365	0
Totals/Averages-	670	950	721.0	0.47	0.08	0.28	341.8	55.5	203.7	1.4		

GRAZING PERIOD

Type of Animal	Percent of Month and Number of Animals Grazing OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	AU-YR.
MILKER	70%	0%	0%	0%	0%	65%	70%	70%	70%	70%	70%	70%	
	400	400	400	400	400	400	400	400	400	400	400	400	2,886
MILKER (DRY)	90%	0%	0%	0%	0%	80%	90%	90%	90%	90%	90%	90%	
	50	50	50	50	50	50	50	50	50	50	50	50	462
HEIFERS (12-24 Months)	100%	0%	0%	0%	0%	0%	100%	100%	100%	100%	100%	100%	
	120	120	120	120	120	120	120	120	120	120	120	120	672
CALVES (1-12 Months)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	100	100	100	100	100	100	100	100	100	100	100	100	0
													0
													0
													0
													0
													0
													0
Total AUM's Available>	500						1000	800	600	600	400	400	4,300
Total AUM's Needed>>>	519	0	0	0	0	390	519	519	519	519	519	519	4,020
Total AUM's>>>>>>>>>>	-19	0	0	0	0	-390	482	282	82	82	-119	-119	281

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET
Version 2.4

2513607
STATE: OREGON

CLIENT: George Allen Inc.
ASSISTED BY: ODA
CHECKED BY: CMT

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

WEATHER STATION: TILLAMOOK 1 W

Month	Precipitation (25Yr-24Hr 6.00) Monthly Average in Inches	Evaporation	Lot Runoff Factors as a Percent of Monthly Precipitation: Paved	Unpaved
October	7.48	1.42	100%	20%
November	12.80	0.75	100%	25%
December	14.25	0.60	100%	25%
January	13.46	0.48	100%	25%
February	10.45	0.78	100%	25%
March	10.35	1.26	100%	15%
April	6.03	1.90	100%	15%
May	4.24	3.22	100%	10%
June	3.16	3.40	100%	10%
July	1.44	3.91	100%	0%
August	1.73	3.52	100%	10%
September	3.69	2.54	100%	15%
Annual	89.08	23.78		

AREAS CONTRIBUTING RUNOFF TO LIQUID STORAGE FACILITY

Description of Runoff Area	Area in SF
Paved Lot Area >>> Is paved lot scraped daily? (Y/N) YES	9,700
Unpaved Lot Area >>	0
Roof Area >>	0
Surface Area of Silage Storage Facility>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> Does Silage Seepage Drain to Storage Facility? (Y/N) NO	0
Total Runoff Area Contributing to Liquid Storage Facility>>>>>>>>>>>>>>>>	9,700

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	260.0	2	0.25	130	17.4
Equipment Wash		2	350.00	700	93.6
Flushwater		0		0	0.0
Miscellaneous		2	25.00	50	6.7
Total>>>				880	117.6

CROP DATA

Field Number	Acres	Crop	Condition	Yield Units	Target Yield	Nutrients Removed in Pounds per Acre: Nitrogen N	Phosphorous P2O5	Potassium K2O
T3 1-5	62.3	Hay/Pasture Mix 16 % Protein	DHM	Ton	8.00	410	114	313
T338 1-3	26.3	Hay/Pasture Mix 16 % Protein	DHM	Ton	8.00	410	114	313
4	16.9	Hay/Pasture Mix 16 % Protein	DHM	Ton	6.00	307	85	235
T616 1	29.0	Hay/Pasture Mix 16 % Protein	DHM	Ton	6.00	307	85	235
T362 1-8	114.5	Hay/Pasture Mix 16 % Protein	DHM	Ton	6.00	307	85	235
Off-Farm								

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 2.4

CLIENT: George Allen Inc.

ASSISTED BY: ODA CHECKED BY: CMT

ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

BEDDING VOLUME

Type of Animal	Type of Bedding Facility	Bedding Material	Unit Weight Lbs/CF	Amount Needed Lbs/Day/AU	Volume CF/Day/AU	Total Volume CF/Day	Total Weight Lbs/Day
MILKER	Free Stall	Chopped Straw	7.00	2.70	0.39	201	1,404
MILKER (DRY)	Free Stall	Chopped Straw	7.00	2.70	0.39	25	176
HEIFERS (12-24 Months)	Free Stall	Chopped Straw	7.00	2.70	0.39	37	259
CALVES (1-12 Months)	Loose Housing	Chopped Straw	7.00	11.00	1.57	63	440

SOLIDS SEPARATION FACTOR

Type of Animal	Type of Separator	Separation Factor %	Volume of Solids Separated CF/Day	Volume of Solids in Liquids CF/Day	Volume of Manure in Liquids CF/Day	Volume of Manure in Solids CF/Day	Accumulated Sludge in Storage CF/Day	Density of Separated Solids Lbs/CF	Weight of Separated Solids Lbs/Day
MILKER	Dry Scrape System	0%	0	296	763	0	505	36	0
MILKER (DRY)	Dry Scrape System	0%	0	33	72	0	32	36	0
HEIFERS (12-24 Months)	Dry Scrape System	0%	0	50	125	0	44	36	0
CALVES (1-12 Months)	Dry Scrape System	100%	115	0	0	52	0	36	4,135
Total Solids>>			115	380	959	52	581		4,135

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 2.4

2513507
STATE: OREGON

CLIENT: George Allen Inc.
ASSISTED BY: ODA

CHECKED BY: CMT

ANIMAL WASTE MANAGEMENT SYSTEM PRODUCTION

MONTHLY VOLUMES

Month	Runoff in Cubic Feet: Roof Area Square Feet 0	Paved Slab Area Square Feet 9,700	Unpaved Lot Area Square Feet 0	Silage Pit Surface Area, SF 0	Facility Water Use Cubic Feet	Manure Solids Cubic Feet	Manure Liquids Cubic Feet	Bedding Cubic Feet	Bedding Pounds	Solids Separated Cubic Feet	Solids Separated Pounds	Solids in Liquids Cubic Feet	Solids in Liquids Pounds	Total Solids Cubic Feet	Total Liquids Cubic Feet
October	0	6,046	0	0	3,647	2,524	6,402	3,892	27,241	3,561	128,181	2,855	102,790	3,561	19,863
November	0	10,347	0	0	3,529	5,069	25,258	9,766	68,361	3,446	124,046	11,389	410,016	3,446	54,991
December	0	11,519	0	0	3,647	5,238	26,100	10,091	70,640	3,561	128,181	11,769	423,683	3,561	56,661
January	0	10,880	0	0	3,647	5,238	26,100	10,091	70,640	3,561	128,181	11,769	423,683	3,561	56,022
February	0	8,447	0	0	3,294	4,731	23,574	9,115	63,804	3,216	115,776	10,630	382,682	3,216	52,097
March	0	8,366	0	0	3,647	3,112	11,087	5,428	37,997	3,561	128,181	4,979	179,251	3,561	29,579
April	0	4,874	0	0	3,529	2,443	6,195	3,766	26,363	3,446	124,046	2,763	99,474	3,446	18,481
May	0	3,427	0	0	3,647	2,524	6,402	3,892	27,241	3,561	128,181	2,855	102,790	3,561	17,244
June	0	2,554	0	0	3,529	2,443	6,195	3,766	26,363	3,446	124,046	2,763	99,474	3,446	16,161
July	0	1,164	0	0	3,647	2,524	6,402	3,892	27,241	3,561	128,181	2,855	102,790	3,561	14,980
August	0	1,398	0	0	3,647	2,524	6,402	3,892	27,241	3,561	128,181	2,855	102,790	3,561	15,215
September	0	2,983	0	0	3,529	2,443	6,195	3,766	26,363	3,446	124,046	2,763	99,474	3,446	16,589
Annual	0	72,006	0	0	42,941	40,814	156,310	71,356	499,493	41,923	1,509,223	70,247	2,528,897	41,923	367,882

DAILY NUTRIENT PRODUCTION

Type of Animal	Pounds/Day of Nutrients from LIQUIDS: N	P2O5	K2O	Pounds/Day of Nutrients from SOLIDS: N	P2O5	K2O	Pounds/Day of Nutrients from GRAZING: N	P2O5	K2O
MILKER	276.23	107.22	188.09	0.00	0.00	0.00	276.23	107.22	188.09
MILKER (DRY)	23.40	7.45	18.01	0.00	0.00	0.00	23.40	7.45	18.01
HEIFERS (12-24 Months)	29.76	8.80	27.76	0.00	0.00	0.00	29.76	8.80	27.76
CALVES (1-12 Months)	0.00	0.00	0.00	12.40	3.67	11.57	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MONTHLY NUTRIENT PRODUCTION

Month	Pounds of Nutrients from LIQUIDS: N	P2O5	K2O	Pounds of Nutrients from SOLIDS: N	P2O5	K2O	Pounds of Nutrients from GRAZING: N	P2O5	K2O	Pounds of Nutrients going OFF-FARM: N	P2O5	K2O	Total Pounds of Nutrients from ALL SOURCES: N	P2O5	K2O
October	2,641	1,020	1,805	384	114	359	7,570	2,807	5,445	0	0	0	10,596	3,941	7,609
November	9,882	3,704	7,016	372	110	347	0	0	0	0	0	0	10,254	3,814	7,363
December	10,211	3,827	7,250	384	114	359	0	0	0	0	0	0	10,596	3,941	7,609
January	10,211	3,827	7,250	384	114	359	0	0	0	0	0	0	10,596	3,941	7,609
February	9,223	3,457	6,548	347	103	324	0	0	0	0	0	0	9,570	3,560	6,872
March	4,065	1,482	3,013	384	114	359	6,146	2,345	4,237	0	0	0	10,596	3,941	7,609
April	2,556	987	1,747	372	110	347	7,325	2,717	5,269	0	0	0	10,254	3,814	7,363
May	2,641	1,020	1,805	384	114	359	7,570	2,807	5,445	0	0	0	10,596	3,941	7,609
June	2,556	987	1,747	372	110	347	7,325	2,717	5,269	0	0	0	10,254	3,814	7,363
July	2,641	1,020	1,805	384	114	359	7,570	2,807	5,445	0	0	0	10,596	3,941	7,609
August	2,641	1,020	1,805	384	114	359	7,570	2,807	5,445	0	0	0	10,596	3,941	7,609
September	2,556	987	1,747	372	110	347	7,325	2,717	5,269	0	0	0	10,254	3,814	7,363
Annual	61,826	23,340	43,538	4,526	1,338	4,222	58,401	21,723	41,824	0	0	0	124,754	46,401	89,585

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 2.4

2513507
STATE: OREGON

CLIENT: **George Allen Inc.**
ASSISTED BY: **ODA**
CHECKED BY: **CMT**

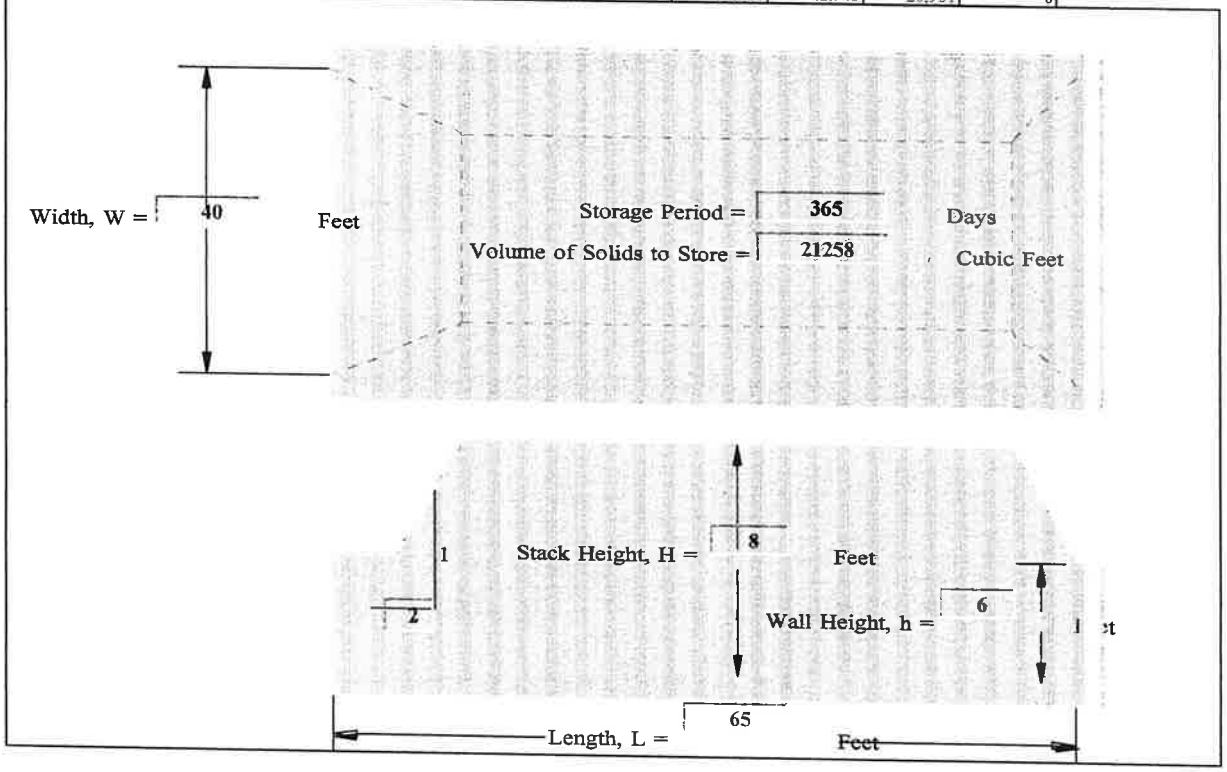
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

SOLIDS STACKING FACILITY

Solids Storage Facility Parameters	Value
Storage Period, Days=	365
Stacking Width, W in Feet=	40
Stacking Height, H in Feet=	8.00
Wall Height, h in Feet=	6.00
Stack Side Slope (X:1)=	2.00
Existing Storage, Cubic Feet=	3,750
Surface Area of Existing Storage, SF=	0
25 Year-24 Hour Storm Runoff, CF=	0
Volume Needed, Cubic Feet=	21,258
Design Volume, Cubic Feet=	17,698
Is Facility Covered?	YES

MONTHLY SOLIDS VOLUME STACKED IN FACILITY

Month	Number of Days	Manure CF	Bedding CF	Solids to Store CF	Normal Runoff CF
October	31	1612	1,949	1,780	0
November	30	1560	1,886	1,723	0
December	31	1612	1,949	1,780	0
January	31	1612	1,949	1,780	0
February	28	1456	1,760	1,608	0
March	31	1612	1,949	1,780	0
April	30	1560	1,886	1,723	0
May	31	1612	1,949	1,780	0
June	30	1560	1,886	1,723	0
July	31	1612	1,949	1,780	0
August	31	1612	1,949	1,780	0
September	30	1560	1,886	1,723	0
Annual	365	18,980	22,943	20,961	0



U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 2.4

2513507
STATE: OREGON

CLIENT: George Allen Inc.
ASSISTED BY: ODA

CHECKED BY: CMT

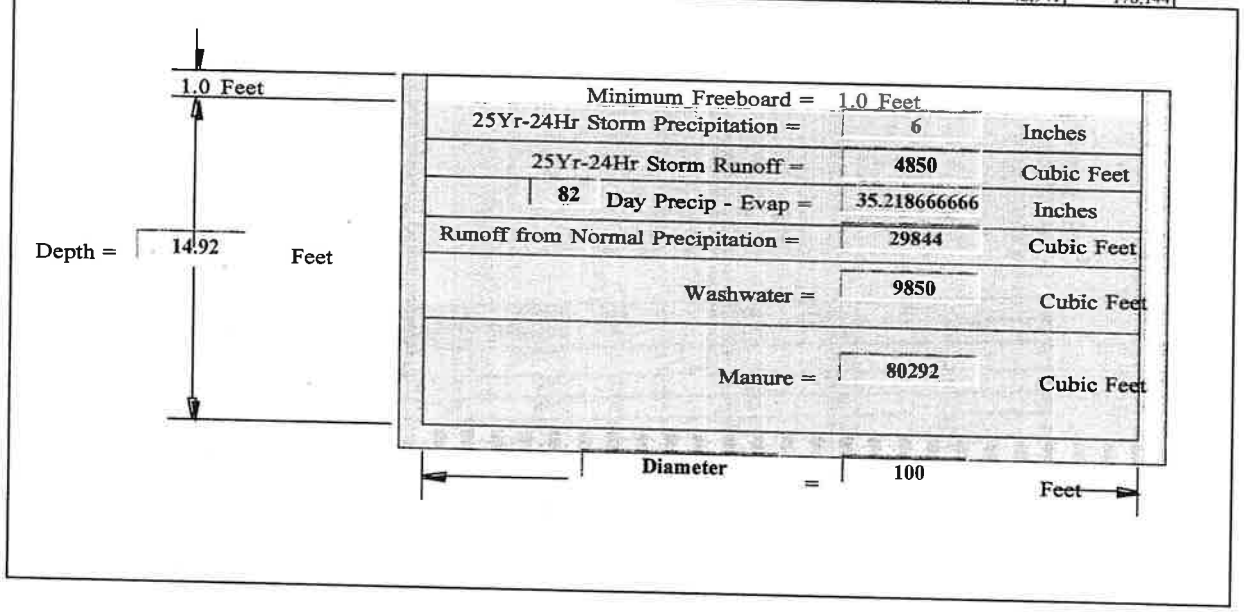
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

TANK

Tank Parameters	Value
Storage Period, Days=	82
Tank Diameter, Feet=	100
Existing Storage, Cubic Feet=	67,351.00
Surface Area of Existing Storage, SF=	0
25 Year-24 Hour Storm Runoff, CF=	4,850
Volume Needed, Cubic Feet=	184,548
Design Volume, Cubic Feet=	117,121
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	Manure CF
October	31	3,964	0	6,046	3,647	7,314
November	30	7,883	0	10,347	3,529	28,767
December	31	8,929	0	11,519	3,647	29,726
January	31	8,491	0	10,880	3,647	29,726
February	28	6,326	0	8,447	3,294	26,849
March	31	5,946	0	8,366	3,647	12,586
April	30	2,702	0	4,874	3,529	7,078
May	31	667	0	3,427	3,647	7,314
June	30	-157	0	2,554	3,529	7,078
July	31	-1,616	0	1,164	3,647	7,314
August	31	-1,171	0	1,398	3,647	7,314
September	30	752	0	2,983	3,529	7,078
Annual	365	42,717	0	72,006	42,941	178,144



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Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET
Version 2.4

2513507
STATE: OREGON

CLIENT: **George Allen Inc.**
ASSISTED BY: **ODA**

CHECKED BY: **CMT**

ANIMAL WASTE MANAGEMENT SYSTEM APPLICATION

MANAGEMENT CRITERIA FOR TRACTOR SPREADER APPLICATION OF SOLIDS

To apply 41,923 cubic feet of solids generated from the operation it will take approximately 104 trips annually. Based on applying NITROGEN, N
at agronomic rate use the application depths, travel lengths, and loads per acre listed below for each crop.

Field Number	Acres	Crop	Tractor Spreader Capacity		Spread Width	NITROGEN, N Concentration in Storage Facility		Pounds of Nutrients to be Applied	Number of Applications Needed to meet Crop Demand	Inches of Solids to Apply	Travel Length per Load Needed in Feet	Loads per Acre
			Bushels	CF	Feet	PPM	Lbs/100CF					
T3 1-5	62.3	Hay/Pasture Mix 16 % Protein	325	404	7	1,298	8.10	410	1.00	2.4	286	22
T338 1-3	26.3	Hay/Pasture Mix 16 % Protein	325	404	7	1,298	8.10	410	1.00	2.4	286	22
4	16.9	Hay/Pasture Mix 16 % Protein	325	404	7	1,298	8.10	307	1.00	1.8	381	16
T616 1	29	Hay/Pasture Mix 16 % Protein	325	404	7	1,298	8.10	307	1.00	1.8	381	16
T362 1-8	114.5	Hay/Pasture Mix 16 % Protein	325	404	7	1,298	8.10	307	1.00	1.8	381	16
0												
0												
0												
0												

MANAGEMENT CRITERIA FOR BIG GUN SPRINKLER APPLICATION OF LIQUIDS

To apply 2,751,758 gallons of liquids generated from the operation it will take approximately 262 hours of pumping annually. Based on applying NITROGEN, N
at agronomic rate use the application depths, set times, and travel rates listed below for each crop.

Field Number	Acres	Crop	Sprinkler Flowrate GPM	Wetted Diameter Feet	Portion of Wetted Diameter Receiving Liquids	NITROGEN, N Concentration in Storage Facility		Pounds of Nutrients to be Applied	Number of Applications Needed to meet Crop Demand	Inches of Liquids to Apply	Application Rate in Inches/Hour	Set Time Needed in Hours	Travel Rate Needed in Feet/Minute
						PPM	Lbs/1000Gal						
T3 1-5	62.3	Hay/Pasture Mix 16 % Protein	175	240	3/4 Circle	1,644	13.72	410	1.00	1.79	0.61	4.79	0.65
T338 1-3	26.3	Hay/Pasture Mix 16 % Protein	175	240	3/4 Circle	1,644	13.72	410	1.00	1.79	0.61	4.79	0.65
4	16.9	Hay/Pasture Mix 16 % Protein	175	240	3/4 Circle	1,644	13.72	307	1.00	1.34	0.61	3.60	0.87
T616 1	29	Hay/Pasture Mix 16 % Protein	175	240	3/4 Circle	1,644	13.72	307	1.00	1.34	0.61	3.60	0.87
T362 1-8	114.5	Hay/Pasture Mix 16 % Protein	175	240	3/4 Circle	1,644	13.72	307	1.00	1.34	0.61	3.60	0.87
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U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET
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STATE: OREGON

CLIENT: **George Allen Inc.**
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CHECKED BY: **CMT**

ANIMAL WASTE MANAGEMENT SYSTEM APPLICATION

MANAGEMENT CRITERIA FOR TANK WAGON APPLICATION OF LIQUIDS

To apply 2,751,758 gallons of liquids generated from the operation it will take approximately 917 trips annually. Based on applying NITROGEN, N
at agronomic rates use the application depths, travel lengths, and loads per acre listed below for each crop.

Field Number	Acres	Crop	Tank Wagon Capacity Gallons	Spread Width Feet	NITROGEN, N Concentration in Storage Facility		Pounds of Nutrients to be Applied	Number of Applications Needed to meet Crop Demand	Inches of Liquids to Apply	Travel Length per Load Needed in Feet	Loads per Acre
					PPM	Lbs/1000Gal					
T3 1-5	62.3	Hay/Pasture Mix 16 % Protein	3,000	16	1,644	13.72	410	1.00	0.68	445	6.1
T338 1-3	26.3	Hay/Pasture Mix 16 % Protein	3,000	16	1,644	13.72	410	1.00	0.68	445	6.1
4	16.9	Hay/Pasture Mix 16 % Protein	3,000	16	1,644	13.72	307	1.00	0.51	593	4.6
T616 1	29	Hay/Pasture Mix 16 % Protein	3,000	16	1,644	13.72	307	1.00	0.51	593	4.6
T362 1-8	114.5	Hay/Pasture Mix 16 % Protein	3,000	16	1,644	13.72	307	1.00	0.51	593	4.6
0											
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ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

NUTRIENTS AVAILABLE AFTER STORAGE

Nutrient Source	Type of Operation / Type of Storage Facility	Pounds of Nutrients Available			Percent Nutrients Retained After Storage			Pounds of Nutrients Retained After Storage		
		N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O
Liquids	Dairy / Tank (Uncovered)	61,826	23,340	43,538	70%	85%	85%	43,278	19,839	37,008
Solids	Solids Storage Facility (Roofed)	4,526	1,338	4,222	75%	90%	90%	3,395	1,204	3,800
Grazing	NONE	58,401	21,723	41,824	100%	100%	100%	58,401	21,723	41,824

NUTRIENTS AVAILABLE AFTER APPLICATION

Nutrient Source	Type of Application System	Pounds of Nutrients Available			Percent Nutrients Retained After Application			Pounds of Nutrients Retained After Application		
		N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O
Liquids	Sprinkling	43,278	19,839	37,008	75%	100%	100%	32,459	19,839	37,008
Solids	Broadcast (Incorporated 7 or more days after application)	3,395	1,204	3,800	70%	100%	100%	2,376	1,204	3,800
Grazing	Grazing	58,401	21,723	41,824	90%	100%	100%	52,561	21,723	41,824

NUTRIENTS AVAILABLE AFTER DENITRIFICATION

Nutrient Source	Location / Soil Drainage Class	Pounds of Nutrients Available			Percent Nutrients Retained After Denitrification			Pounds of Nutrients Retained After Denitrification		
		N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O
Liquids	Coast / Moderately Well Drained	32,459	19,839	37,008	82%	100%	100%	26,616	19,839	37,008
Solids	Moderately Well Drained	2,376	1,204	3,800	82%	100%	100%	1,948	1,204	3,800
Grazing	Moderately Well Drained	52,561	21,723	41,824	82%	100%	100%	43,100	21,723	41,824

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET
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ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

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

Field Number	Acres	Crop	LIQUIDS			SOLIDS			GRAZING		
			Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients	Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients	Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients
T3 1-5	62.3	Hay/Pasture Mix 16 % Protein	35%	9,316	23	28%	542	1	28%	12,088	30
T338 1-3	26.3	Hay/Pasture Mix 16 % Protein	10%	2,662	6	23%	452	1	15%	6,445	16
4	16.9	Hay/Pasture Mix 16 % Protein	0%	0	0	0%	0	0	11%	4,801	16
T616 1	29.0	Hay/Pasture Mix 16 % Protein	10%	2,662	9	11%	214	1	10%	4,297	14
T362 1-8	114.5	Hay/Pasture Mix 16 % Protein	45%	11,977	39	38%	740	2	36%	15,468	50
0											
0											
0											
0											
Off-Farm											
		TOTALS-	0%	0		0%	0		0%	0	
			100%	26,616	77	100%	1,948	6	100%	43,100	125

NUTRIENT BALANCE BASED ON AVAILABLE ACRES

Field Number	Acres	Crop	NUTRIENTS APPLIED			- NUTRIENTS REMOVED			= NUTRIENT BALANCE		
			Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre
T3 1-5	62.3	Hay/Pasture Mix 16 % Protein	352	215	413	410	114	313	-57	101	100
T338 1-3	26.3	Hay/Pasture Mix 16 % Protein	363	210	412	410	114	313	-46	96	99
4	16.9	Hay/Pasture Mix 16 % Protein	284	143	276	307	85	235	-23	58	41
T616 1	29.0	Hay/Pasture Mix 16 % Protein	247	148	286	307	85	235	-60	62	51
T362 1-8	114.5	Hay/Pasture Mix 16 % Protein	246	150	289	307	85	235	-61	65	54
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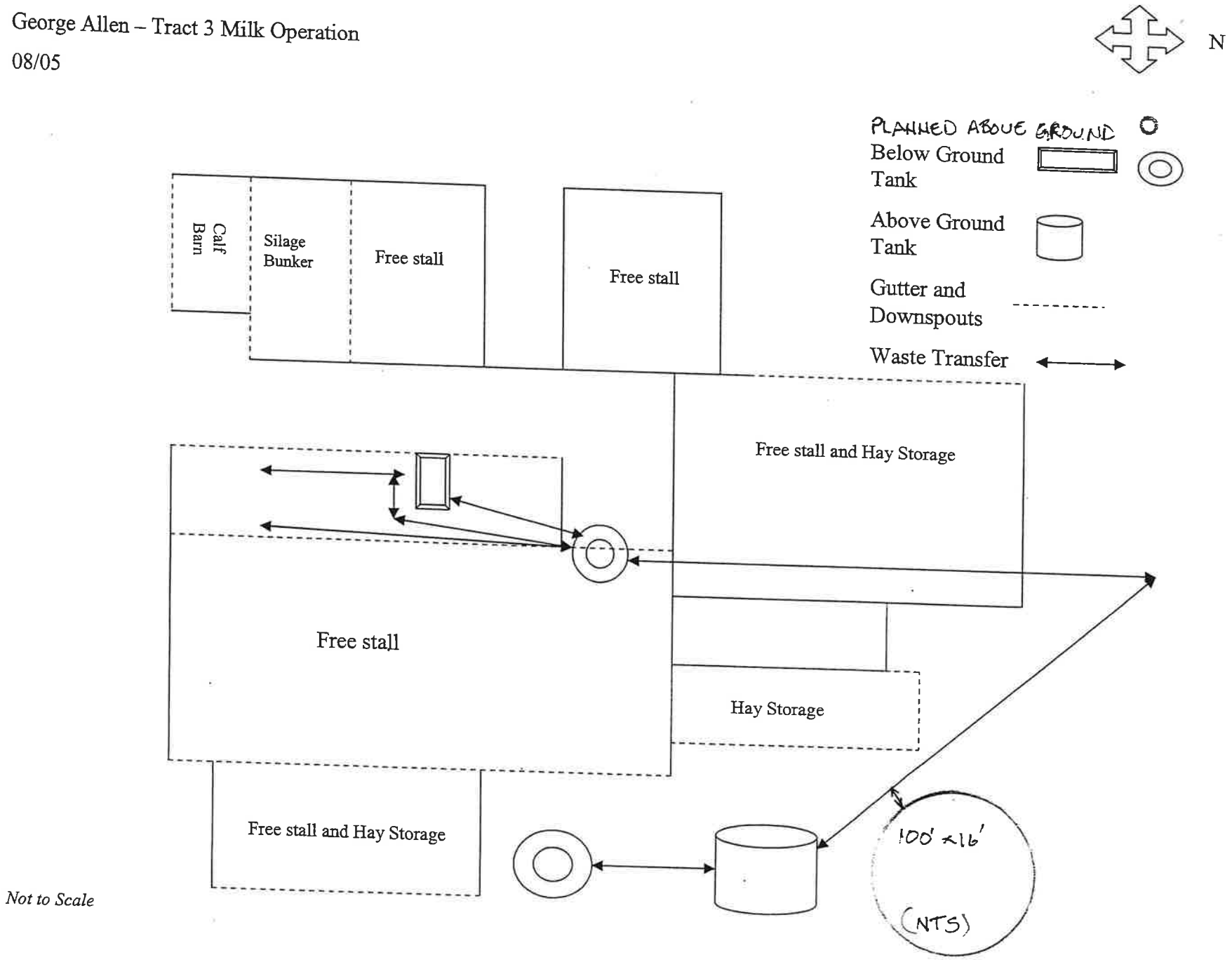
0											
0											
0											
Off-Farm											

George Allen – Tract 3 Milk Operation

08/05



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U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

OPERATION AND MAINTENANCE WORKSHEET

WASTE STORAGE FACILITY
CODE 313

For: Landowner/Operator George Allen

Job Location: T1S R9W Sec 19

County Tillamook SWCD Tillamook Farm/Tract No. Tract 3

Prepared By Kent Perkins Date 01/03/07

100' x 16' above ground liquid waste storage tank

Operation and Maintenance Items

A properly operated and maintained waste storage structure is an asset to your farm. This waste storage structure was designed and installed for temporary storage of animal wastes. The estimated life span of this installation is at least 10 years. If at any time this structure is taken out of service, the Natural Resources Division of the Oregon Department of Agriculture should be contacted for guidance in decommissioning the structure to avoid environmental concerns. The life of this installation can be assured and usually increased by developing and carrying out a good operation and maintenance program.

This practice will require you to perform periodic operation and maintenance to maintain satisfactory performance. A good operation and maintenance plan includes:

⇒ Do not allow equipment that exceeds the design loading to operate within 20 feet of the structure.

⇒ **WARNING: ENTERING AN UNVENTILATED TANK IS EXTEREMELY "HAZARDOUS" !** Do not allow human entry into the enclosed structure without safety equipment that includes ladders and breathing apparatus.

⇒ Continually maintain all pumps, agitators, piping, valves and all other electrical and mechanical equipment in good operating condition by following the manufacturer's recommendations.

⇒ Continually maintain grounding rods and wiring for all electrical equipment in good condition.

⇒ Facilities will be empty by October 1st to begin winter storage.

⇒ A one foot free board will be maintained to prevent spillage.

⇒ The waste storage facility will be inspected weekly to ensure structural integrity.

⇒ Perform daily inspections of waterlines, including drinking water or cooling water lines. Repair leaking lines immediately to prevent excess water from entering the waste storage system.

⇒ Depth markers are installed in the facility and maintained to assure the maximum volume will be maintained under normal operating conditions allowing for the volume necessary to contain the 25-year, 24-hour rainfall event.

⇒ The depth of all liquid manure will be recorded during each week's inspection.

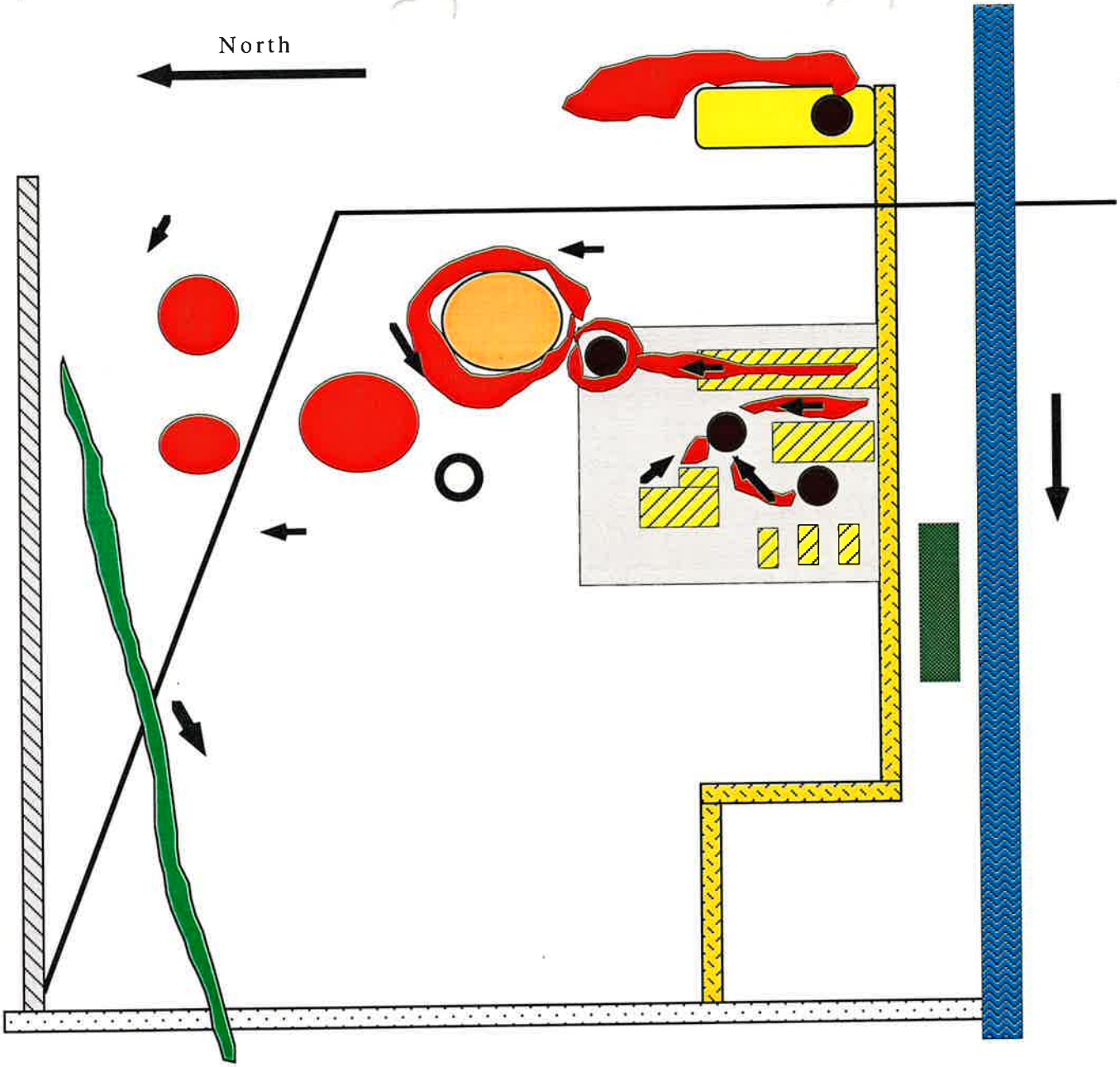
⇒ Immediately repair any vandalism, vehicular or livestock damage to the structure, earthen areas surrounding the structure, or any appurtenances.

⇒ Pump out the facility within the first two years following construction to check for structural damage. If damage is noted, immediately seek a qualified engineer to assess the situation. Thereafter, it should be pumped out at least every four years to check for damages, remove gravel, rocks, sand, wire and other debris to maintain the designed storage capacity.

⇒ Immediately remove all foreign debris within the structure that may cause damage to pumps and agitator.

⇒ During de-watering of the structure, ensure that waste is spread at minimum rates in areas where crops are grown, spread waste no closer than 50 feet from open watercourses during the winter months and apply no manure within 35 feet of an open watercourse during the summer months. Avoid applying waste during heavy rainfall events.

⇒ Dead animals will not be disposed of in the liquid waste storage facility.



Legend

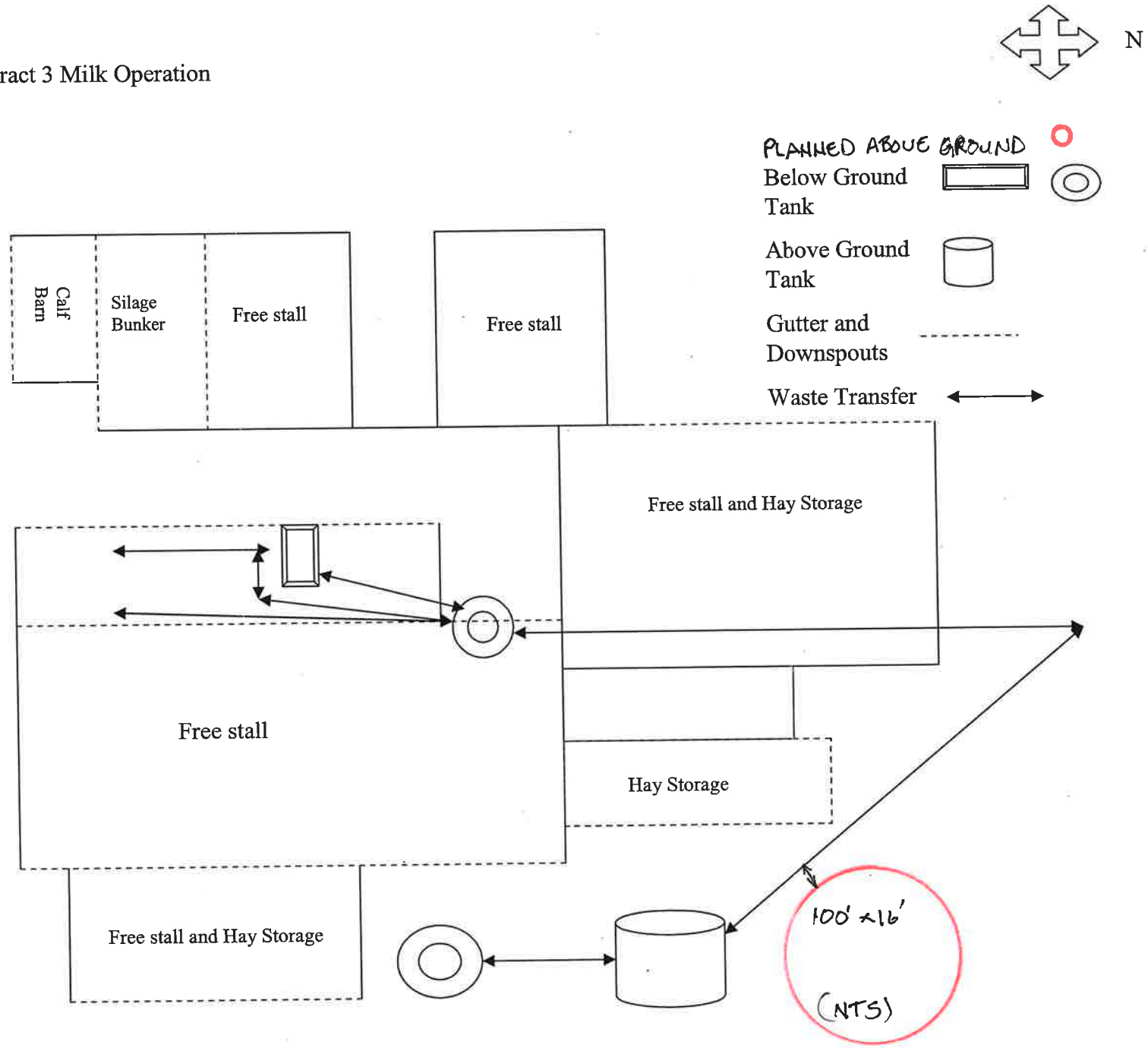
- Above Ground Tank
- Below Ground Tanks
- Concrete Slab
- Drainage Ditch
- East Heifer Barn
- Farm Lane
- Headquarters
- Highway 101
- Main CAFO
- Latimer Road
- Rail Road Track
- Stationary Big Gun
- Wilson River
- Wastewater Accumulations

George & Ruth Allen
S 19 T 1 S R 9W
Tillamook , OR

Alan Youse
5-1-97

George Allen – Tract 3 Milk Operation

08/05



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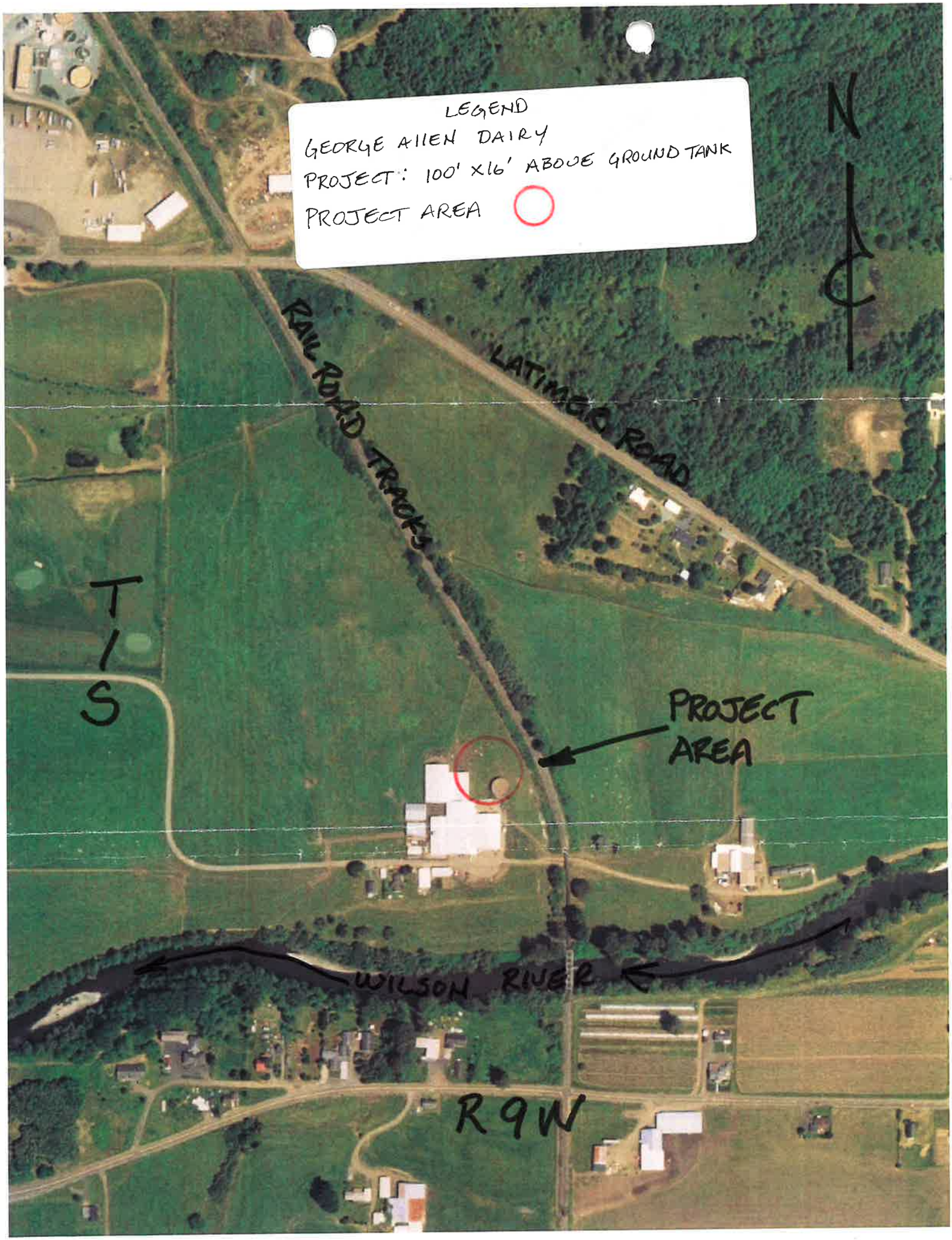
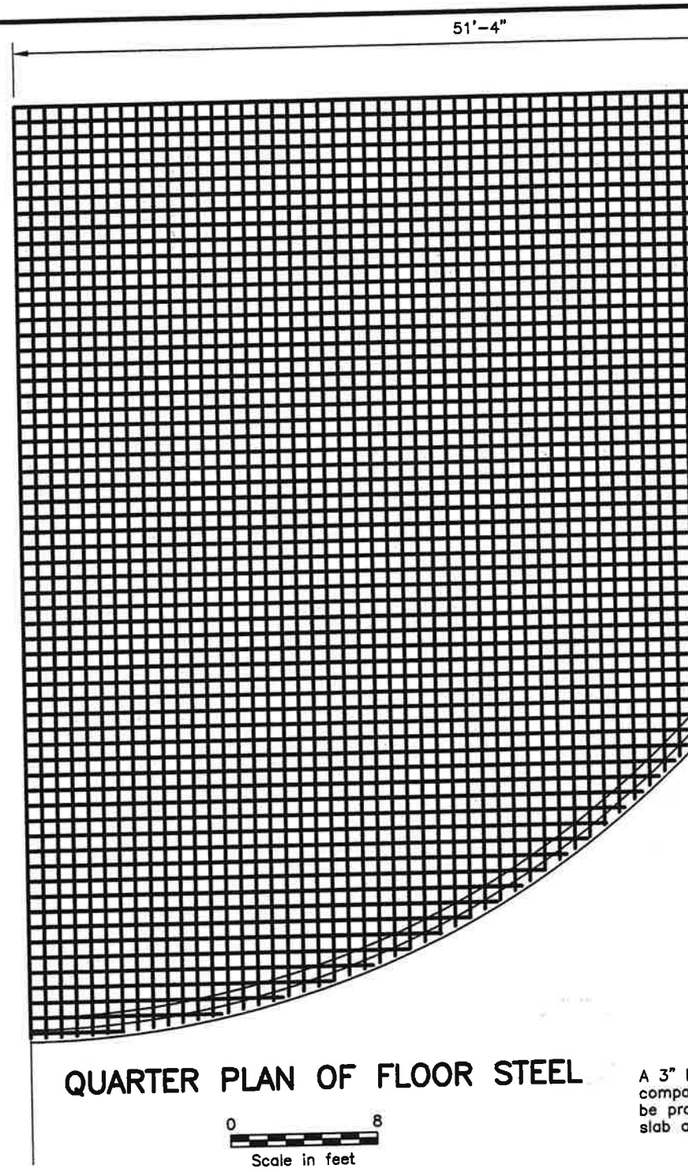
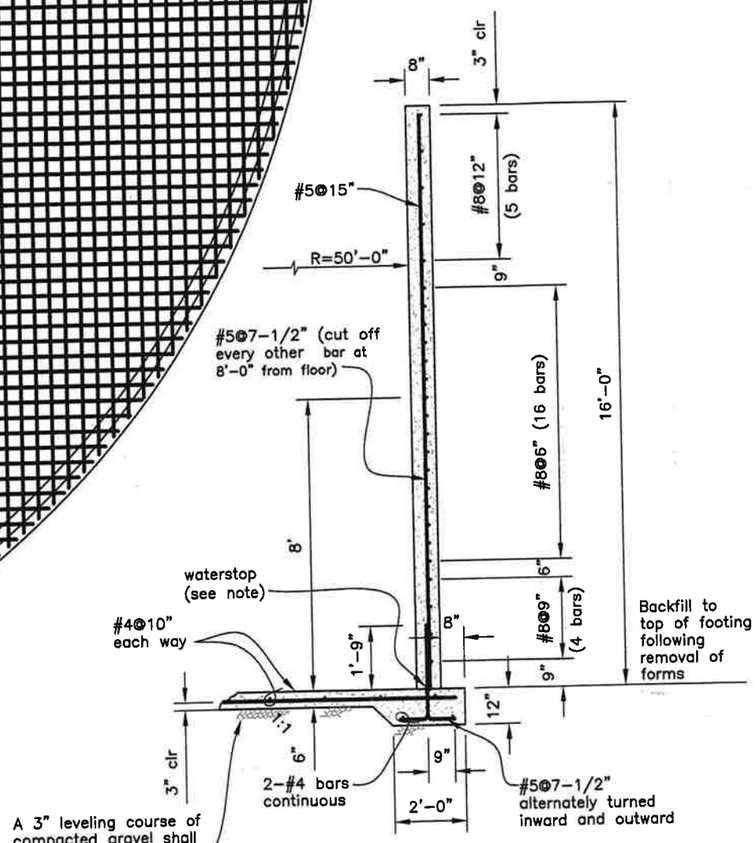

LEGEND
GEORGE ALLEN DAIRY
PROJECT: 100' X 16' ABOVE GROUND TANK
PROJECT AREA
N
RAIL ROAD TRACKS
LATIMER ROAD
T
1
S
PROJECT AREA
WILSON RIVER
R9W



QUARTER PLAN OF FLOOR STEEL

0 8
Scale in feet



TYPICAL WALL SECTION

0 4
Scale in feet

UTILITY NOTE:

NRCS makes no representation as to the existence or non-existence of utilities. It is the responsibility of landowners or operators and contractors to comply with the provisions of ORS 757.541 to 757.571. Landowners or operators and contractors will be liable for any damage resulting from disruption of service caused by construction activities.

LANDOWNER ACKNOWLEDGMENT STATEMENT

I have reviewed the drawings and applicable specifications and understand their construction requirements.

George Allen — Landowner/Operator

3-2-07 — Date

LAP SPLICE LENGTHS

bar size	lap length
#4	16"
#5	19"
#8	48"

All laps in the horizontal wall steel shall be staggered at least one lap length.

ESTIMATED QUANTITIES

Concrete (to neat lines)	
Item	Volume (cy)
Floor & Footing	166.4
Walls	124.9
Total	291.3

Steel Reinforcement (including splices)		
Bar No.	Length (ft)	Weight (lbs)
4	21,760	14,536
5	7,400	7,718
8	9,917	26,478

CONCRETE SPECIFICATIONS

1. The concrete shall have a minimum compressive strength at 28 days of 3000 psi. Minimum cement content shall be 6 bags/cy and maximum net water content shall be 5.2 gal/bag. The slump shall be 2 to 4 inches and the air content shall be 5 to 8% of the volume of concrete.
2. Forms shall be mortar tight, substantial and unyielding and shall be constructed so that the finished concrete will conform to the specified dimensions. Metal ties within the forms shall be equipped with a device that permits their removal to a depth of at least 1 inch without injury to the concrete.
3. The concrete shall be deposited as closely as possible to its final position in the forms and around all reinforcement. Immediately after placement the concrete shall be consolidated by vibrating.
4. Waterstops shall be held firmly in correct position as the concrete is placed.
5. Unless otherwise shown, the concrete cover over reinforcement shall be 3" for concrete cast against earth or gravel and 2" for concrete cast against forms.
6. Adjustments to the reinforcing steel around embedded fittings shall be approved in advance by the Engineer.
7. Forms shall not be removed before 24 hours after placement of concrete.
8. Holes produced by the removal of form ties, cone bolts, etc., shall be cleaned, wetted, and filled with dry pack mortar.
9. Construction joints shall be left rough and shall be thoroughly cleaned and wetted prior to placing the subsequent lift of concrete. Construction joints shall be moist cured without curing compound, or curing compound shall be removed by sand blasting or high pressure washing.
10. Concrete shall be prevented from drying for a curing period of at least 7 days after it is placed. The slab and footings shall be kept continuously moist for the entire period or until curing compound is applied. Moisture shall be maintained by sprinkling, flooding, covering with plastic sheeting, continuously moistened canvas, cloth mats, straw, or other approved material. The walls shall be thoroughly wetted immediately after forms are removed and shall be kept wet until patching and repairs are made. After patching and repairs are made, curing compound may be applied in lieu of wetting. Curing compound shall meet the requirements of ASTM C 309, Type 2.
11. Concrete shall not be dropped more than 5 feet vertically unless suitable equipment is used to prevent segregation.
12. Concrete shall be protected from freezing for the first 72 hours after placement.

DESIGN AND CONSTRUCTION NOTES

1. Waterstops shall be a non-metallic waterstop of vinyl chloride polymer or copolymer 5" wide, 3/16-inch thick, double-bulbed shaped, or similar. If wall is poured in more than one lift, a waterstop shall be used at each construction joint.
2. Foundation is to be field investigated to determine adequacy to support structure. Footing bearing pressure used in design is 1300 psf.
3. Reinforcing steel shall meet the requirements of ASTM A 615, Grade 60. The vertical reinforcing steel in the wall shall be centered in the section.
4. The structure is designed for an internal hydrostatic load of 65 psf/ft of depth and an external wind load (net) of 10 psf.
5. Warning signs, ladders, ropes, bars, rails, and other devices shall be provided as appropriate to insure the safety of people operating pumping equipment, etc.
6. Frost heave potential should be considered on a site-by-site basis. Additional free-draining rock or other protection methods should be provided as needed.
7. If backfill is to be placed against this structure, it shall be done in accordance with Oregon Backfill Detail Drawing (filename: or_awm_above_circular_backfill.dwg).
8. Design folder is available at:

USDA - NRCS
1201 NE Lloyd Blvd., Suite 900
Portland, Oregon 97232
Attn: State Conservation Engineer

STANDARDIZED DESIGNS
Must Be Adapted To The Specific Site

Practice Code _____ Job Class _____

	Date
Designed Ben Doerge	8/2000
Drawn LLK / KLY	8/2000
Checked Ben Doerge	9/2000
Approved Dave Dishman	9/2000
Title State Conservation Engineer	

WASTE STORAGE TANK
ABOVE GROUND CIRCULAR CONCRETE
16' HIGH X 100' DIA. - 125,664 Cu Ft.

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

File Name
or_awm_above_16h100dia.dwg

Drawing No.

Sheet 1 of 1

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET

Version 2.4

4/25/06
STATE: OREGON

CLIENT: ORAWM REVISED
ASSISTED BY: CHARLENE TROOST CHECKED BY:

63275

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= 60						Manure CF/D/AU	Annual	
				Nutrient Production								
				(lbs./day/1000 lb. Animal Unit)			(lbs./day)					
				N	P	K	N	P	K		Days Confined	Days Grazed
MILKER	244	1,300	317.2	0.53	0.09	0.30	168.50	28.55	95.22	1.47	197	168
MILKER (DRY)	36	1,300	46.8	0.36	0.05	0.23	16.85	2.34	10.76	1.10	148	217
HEIFERS (12-24 Months)	105	800	84.0	0.31	0.04	0.24	26.04	3.36	20.16	1.30	126	239
CALVES (1-12 Months)	70	400	28.0	0.31	0.04	0.24	8.68	1.12	6.72	1.30	365	0
Totals/Averages-	455	950	476.0	0.46	0.07	0.28	220.1	35.4	132.9	1.4		

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	70%	0%	0%	0%	0%	60%	70%	70%	70%	70%	70%	70%	
	244	244	244	244	244	244	244	244	244	244	244	244	1,745
MILKER (DRY)	90%	0%	0%	0%	0%	80%	90%	90%	90%	90%	90%	90%	
	36	36	36	36	36	36	36	36	36	36	36	36	332
HEIFERS (12-24 Months)	100%	0%	0%	0%	0%	80%	100%	100%	100%	100%	100%	100%	
	105	105	105	105	105	105	105	105	105	105	105	105	655
CALVES (1-12 Months)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	70	70	70	70	70	70	70	70	70	70	70	70	0
													0
													0
													0
													0
													0
													0
Total AUM's Available>	99						102	102	102	101	101	101	708
Total AUM's Needed>>>	348	0	0	0	0	295	348	348	348	348	348	348	2,732
Total AUM's>>>>>>>>>>	-249	0	0	0	0	-295	-246	-246	-246	-247	-247	-247	-2,024

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ANIMAL WASTE MANAGEMENT SYSTEM INVENTORY

WEATHER STATION: TILLAMOOK 1 W

Month	25Yr-24Hr	6.00	Lot Runoff Factors as a Percent of Monthly Precipitation	
	Monthly Average in Inches			
	Precipitation	Evaporation	Paved	Unpaved
October	7.48	1.42	100%	20%
November	12.80	0.75	100%	25%
December	14.25	0.60	100%	25%
January	13.46	0.48	100%	25%
February	10.45	0.78	100%	25%
March	10.35	1.26	100%	15%
April	6.03	1.90	100%	15%
May	4.24	3.22	100%	10%
June	3.16	3.40	100%	10%
July	1.44	3.91	100%	0%
August	1.73	3.52	100%	10%
September	3.69	2.54	100%	15%
Annual	89.08	23.78		

AREAS CONTRIBUTING RUNOFF TO LIQUID STORAGE FACILITY

Description of Runoff Area	Area in SF
Paved Lot Area >> Is paved lot scraped daily? (Y/N) YES	9,900
Unpaved Lot Area >>>	0
Roof Area >>	0
Surface Area of Silage Storage Facility>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> Does Silage Seepage Drain to Storage Facility? (Y/N) NO	0
Total Runoff Area Contributing to Liquid Storage Facility>>>>>>>>>>>>>>>	9,900

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	244.0	2	0.25	122	16.3
Equipment Wash		2	350.00	700	93.6
Flushwater		2		0	0.0
Miscellaneous		2	25.00	50	6.7
Total>>>				872	116.6

CROP DATA

Field Number	Acres	Crop	Condition	Yield Units	Target Yield	Nutrients Removed in Pounds per Acre: Nitrogen N	Phosphorous P2O5	Potassium K2O
T3 1-5	62.3	Hay/Pasture Mix 20% Protein	DHM	Ton	8.00	512	141	391
T338 1-3	26.3	Hay/Pasture Mix 20% Protein	DHM	Ton	8.00	512	141	391
4	16.9	Hay/Pasture Mix 20% Protein	DHM	Ton	6.00	384	106	294
T616 1	29.0	Hay/Pasture Mix 20% Protein	DHM	Ton	6.00	384	106	294
T362 1-8	114.5	Hay/Pasture Mix 20% Protein	DHM	Ton	6.00	384	106	294
Off-Farm								

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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	Free Stall	Chopped Straw	7.00	2.70	0.39	122	856
MILKER (DRY)	Free Stall	Chopped Straw	7.00	2.70	0.39	18	126
HEIFERS (12-24 Months)	Free Stall	Chopped Straw	7.00	2.70	0.39	32	227
CALVES (1-12 Months)	Loose Housing	Chopped Straw	7.00	11.00	1.57	44	308

SOLIDS SEPARATION FACTOR

Type of Animal	Type of Separator	Separation Factor %	Volume of Solids Separated CF/Day	Volume of Solids in Liquids CF/Day	Volume of Manure in Liquids CF/Day	Volume of Manure in Solids CF/Day	Accumulated Sludge in Storage CF/Day	Density of Separated Solids Lbs/CF	Weight of Separated Solids Lbs/Day
MILKER	Dry Scrape System	0%	0	180	465	0	308	36	0
MILKER (DRY)	Dry Scrape System	0%	0	24	51	0	23	36	0
HEIFERS (12-24 Months)	Dry Scrape System	0%	0	44	109	0	39	36	0
CALVES (1-12 Months)	Dry Scrape System	100%	80	0	0	36	0	36	2,894
Total Solids>>>			80	249	626	36	370		2,894

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Version 2.4

CLIENT: **ORAWM**
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CHECKED BY:

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 9,900	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	6,171	0	0	3,614	1,688	3,927	2,558	17,905	2,492	89,726	1,753	63,111	2,492	16,024
November	0	10,560	0	0	3,497	3,366	16,502	6,504	45,528	2,412	86,832	7,458	268,493	2,412	40,917
December	0	11,756	0	0	3,614	3,478	17,052	6,721	47,046	2,492	89,726	7,707	277,443	2,492	42,479
January	0	11,105	0	0	3,614	3,478	17,052	6,721	47,046	2,492	89,726	7,707	277,443	2,492	41,827
February	0	8,621	0	0	3,264	3,142	15,402	6,070	42,493	2,251	81,043	6,961	250,593	2,251	38,248
March	0	8,539	0	0	3,614	1,959	5,934	3,194	22,357	2,492	89,726	2,660	95,776	2,492	21,578
April	0	4,975	0	0	3,497	1,633	3,800	2,475	17,327	2,412	86,832	1,697	61,076	2,412	14,654
May	0	3,498	0	0	3,614	1,688	3,927	2,558	17,905	2,492	89,726	1,753	63,111	2,492	13,351
June	0	2,607	0	0	3,497	1,633	3,800	2,475	17,327	2,412	86,832	1,697	61,076	2,412	12,287
July	0	1,188	0	0	3,614	1,688	3,927	2,558	17,905	2,492	89,726	1,753	63,111	2,492	11,041
August	0	1,427	0	0	3,614	1,688	3,927	2,558	17,905	2,492	89,726	1,753	63,111	2,492	11,280
September	0	3,044	0	0	3,497	1,633	3,800	2,475	17,327	2,412	86,832	1,697	61,076	2,412	12,724
Annual	0	73,491	0	0	42,551	27,074	99,048	46,867	328,069	29,346	1,056,456	44,595	1,605,420	29,346	276,410

DAILY NUTRIENT PRODUCTION

Type of Animal	Pounds/Day of Nutrients from LIQUIDS			Pounds/Day of Nutrients from SOLIDS			Pounds/Day of Nutrients from GRAZING		
	N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O
MILKER	168.50	65.40	114.74	0.00	0.00	0.00	168.50	65.40	114.74
MILKER (DRY)	16.85	5.36	12.97	0.00	0.00	0.00	16.85	5.36	12.97
HEIFERS (12-24 Months)	26.04	7.70	24.29	0.00	0.00	0.00	26.04	7.70	24.29
CALVES (1-12 Months)	0.00	0.00	0.00	8.68	2.57	8.10	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

MONTHLY NUTRIENT PRODUCTION

Month	Pounds of Nutrients from LIQUIDS			Pounds of Nutrients from SOLIDS			Pounds of Nutrients from GRAZING			Pounds of Nutrients going OFF-FARM			Total Pounds of Nutrients from ALL SOURCES		
	N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O
October	1,619	625	1,107	269	80	251	4,934	1,807	3,605	0	0	0	6,822	2,512	4,963
November	6,342	2,354	4,560	260	77	243	0	0	0	0	0	0	6,602	2,431	4,803
December	6,553	2,432	4,712	269	80	251	0	0	0	0	0	0	6,822	2,512	4,963
January	6,553	2,432	4,712	269	80	251	0	0	0	0	0	0	6,822	2,512	4,963
February	5,919	2,197	4,256	243	72	227	0	0	0	0	0	0	6,162	2,269	4,483
March	2,355	892	1,654	269	80	251	4,198	1,540	3,058	0	0	0	6,822	2,512	4,963
April	1,567	605	1,072	260	77	243	4,775	1,749	3,488	0	0	0	6,602	2,431	4,803
May	1,619	625	1,107	269	80	251	4,934	1,807	3,605	0	0	0	6,822	2,512	4,963
June	1,567	605	1,072	260	77	243	4,775	1,749	3,488	0	0	0	6,602	2,431	4,803
July	1,619	625	1,107	269	80	251	4,934	1,807	3,605	0	0	0	6,822	2,512	4,963
August	1,619	625	1,107	269	80	251	4,934	1,807	3,605	0	0	0	6,822	2,512	4,963
September	1,567	605	1,072	260	77	243	4,775	1,749	3,488	0	0	0	6,602	2,431	4,803
Annual	**38,900**	**14,621**	**27,537**	**3,168**	**937**	**2,956**	**38,257**	**14,018**	**27,942**	**0**	**0**	**0**	**80,325**	**29,575**	**58,435**

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CHECKED BY:

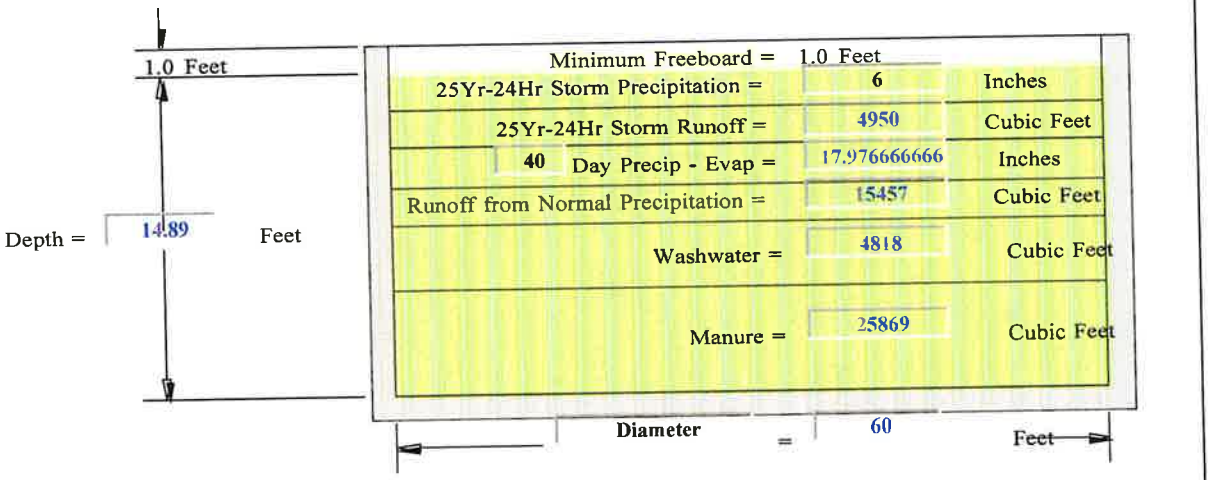
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

TANK

Tank Parameters	Value
Storage Period, Days=	40
Tank Diameter, Feet=	60
Existing Storage, Cubic Feet=	24,936.00
Surface Area of Existing Storage, SF=	0
25 Year-24 Hour Storm Runoff, CF=	4,950
Volume Needed, Cubic Feet=	67,017
Design Volume, Cubic Feet=	42,079
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	Manure CF
October	31	1,427	0	6,171	3,614	4,486
November	30	2,838	0	10,560	3,497	18,776
December	31	3,215	0	11,756	3,614	19,402
January	31	3,057	0	11,105	3,614	19,402
February	28	2,277	0	8,621	3,264	17,524
March	31	2,141	0	8,539	3,614	6,765
April	30	973	0	4,975	3,497	4,341
May	31	240	0	3,498	3,614	4,486
June	30	-57	0	2,607	3,497	4,341
July	31	-582	0	1,188	3,614	4,486
August	31	-422	0	1,427	3,614	4,486
September	30	271	0	3,044	3,497	4,341
Annual	365	15,378	0	73,491	42,551	112,835



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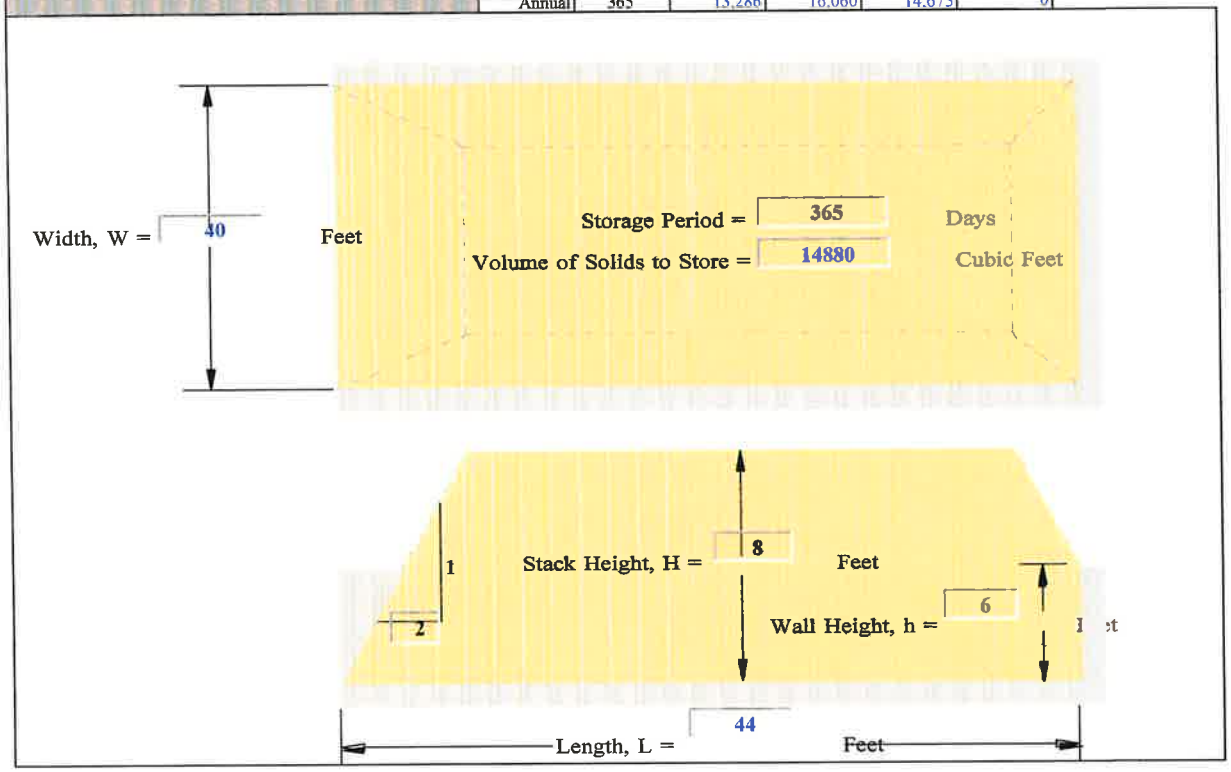
ANIMAL WASTE MANAGEMENT SYSTEM STORAGE

SOLIDS STACKING FACILITY

Solids Storage Facility Parameters	Value
Storage Period, Days=	365
Stacking Width, W in Feet=	40
Stacking Height, H in Feet=	8.00
Wall Height, h in Feet=	6.00
Stack Side Slope (X:1)=	2.00
Existing Storage, Cubic Feet=	3,750
Surface Area of Existing Storage, SF=	0
25 Year-24 Hour Storm Runoff, CF=	0
Volume Needed, Cubic Feet=	14,880
Design Volume, Cubic Feet=	11,146
Is Facility Covered?	YES

MONTHLY SOLIDS VOLUME STACKED IN FACILITY

Month	Number of Days	Manure CF	Bedding CF	Solids to Store CF	Normal Runoff CF
October	31	1128	1,364	1,246	0
November	30	1092	1,320	1,206	0
December	31	1128	1,364	1,246	0
January	31	1128	1,364	1,246	0
February	28	1019	1,232	1,126	0
March	31	1128	1,364	1,246	0
April	30	1092	1,320	1,206	0
May	31	1128	1,364	1,246	0
June	30	1092	1,320	1,206	0
July	31	1128	1,364	1,246	0
August	31	1128	1,364	1,246	0
September	30	1092	1,320	1,206	0
Annual	365	13,286	16,060	14,673	0



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ANIMAL WASTE MANAGEMENT SYSTEM APPLICATION

MANAGEMENT CRITERIA FOR TANK WAGON APPLICATION OF LIQUIDS

To apply 2,067,546 gallons of liquids generated from the operation it will take approximately 689 trips annually. Based on applying NITROGEN, N
at agronomic rates use the application depths, travel lengths, and loads per acre listed below for each crop.

Field Number	Acres	Crop	Tank Wagon Capacity Gallons	Spread Width Feet	NITROGEN, N Concentration in Storage Facility PPM	NITROGEN, N Concentration in Storage Facility Lbs/1000Gal	Pounds of Nutrients to be Applied	Number of Applications Needed to meet Crop Demand	Inches of Liquids to Apply	Travel Length per Load Needed in Feet	Loads per Acre
T3 1-5	62.3	Hay/Pasture Mix 20% Protein	3,000	16	1,184	9.88	512	1.00	1.17	256	10.6
3 1-3	26.3	Hay/Pasture Mix 20% Protein	3,000	16	1,184	9.88	512	1.00	1.17	256	10.6
4	16.9	Hay/Pasture Mix 20% Protein	3,000	16	1,184	9.88	384	1.00	0.88	342	8.0
T616 1	29	Hay/Pasture Mix 20% Protein	3,000	16	1,184	9.88	384	1.00	0.88	342	8.0
T362 1-8	114.5	Hay/Pasture Mix 20% Protein	3,000	16	1,184	9.88	384	1.00	0.88	342	8.0
0											
0											
0											
0											

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ANIMAL WASTE MANAGEMENT SYSTEM APPLICATION

MANAGEMENT CRITERIA FOR TRACTOR SPREADER APPLICATION OF SOLIDS

To apply 29,346 cubic feet of solids generated from the operation it will take approximately 73 trips annually. Based on applying NITROGEN, N
at agronomic rate use the application depths, travel lengths, and loads per acre listed below for each crop.

Field Number	Acres	Crop	Tractor Spreader Capacity		Spread Width	NITROGEN, N Concentration in Storage Facility		Pounds of Nutrients to be Applied	Number of Applications Needed to meet Crop Demand	Inches of Solids to Apply	Travel Length per Load Needed in Feet	Loads per Acre
			Bushels	CF	Feet	PPM	Lbs/100CF					
1-5	62.3	Hay/Pasture Mix 20% Protein	325	404	7	1,125	7.02	512	1.00	3.5	198	31
1-3	26.3	Hay/Pasture Mix 20% Protein	325	404	7	1,125	7.02	512	1.00	3.5	198	31
4	16.9	Hay/Pasture Mix 20% Protein	325	404	7	1,125	7.02	384	1.00	2.6	264	24
T616 1	29	Hay/Pasture Mix 20% Protein	325	404	7	1,125	7.02	384	1.00	2.6	264	24
T362 1-8	114.5	Hay/Pasture Mix 20% Protein	325	404	7	1,125	7.02	384	1.00	2.6	264	24
0												
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MANAGEMENT CRITERIA FOR BIG GUN SPRINKLER APPLICATION OF LIQUIDS

To apply 2,067,546 gallons of liquids generated from the operation it will take approximately 197 hours of pumping annually. Based on applying NITROGEN, N
at agronomic rate use the application depths, set times, and travel rates listed below for each crop.

Field Number	Acres	Crop	Sprinkler Flowrate GPM	Wetted Diameter Feet	Portion of Wetted Diameter Receiving Liquids	NITROGEN, N Concentration in Storage Facility		Pounds of Nutrients to be Applied	Number of Applications Needed to meet Crop Demand	Inches of Liquids to Apply	Application Rate in Inches/Hour	Set Time Needed in Hours	Travel Rate Needed in Feet/Minute
						PPM	Lbs/1000Gal						
1-5	62.3	Hay/Pasture Mix 20% Protein	175	240	3/4 Circle	1,184	9.88	512	1.00	3.10	0.61	8.32	0.38
1338 1-3	26.3	Hay/Pasture Mix 20% Protein	175	240	3/4 Circle	1,184	9.88	512	1.00	3.10	0.61	8.32	0.38
4	16.9	Hay/Pasture Mix 20% Protein	175	240	3/4 Circle	1,184	9.88	384	1.00	2.33	0.61	6.24	0.50
T616 1	29	Hay/Pasture Mix 20% Protein	175	240	3/4 Circle	1,184	9.88	384	1.00	2.33	0.61	6.24	0.50
T362 1-8	114.5	Hay/Pasture Mix 20% Protein	175	240	3/4 Circle	1,184	9.88	384	1.00	2.33	0.61	6.24	0.50
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ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

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

Field Number	Acres	Crop	LIQUIDS			SOLIDS			GRAZING		
			Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients	Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients	Percent to be Applied	Pounds of Nutrients to be Applied	Acres Needed for Utilization of Nutrients
T3 1-5	62.3	Hay/Pasture Mix 20% Protein	40%	6,699	13	8%	109	0	40%	11,293	22
T338 1-3	26.3	Hay/Pasture Mix 20% Protein	35%	5,861	11	45%	614	1	20%	5,647	11
4	16.9	Hay/Pasture Mix 20% Protein	5%	837	2	25%	341	1	10%	2,823	7
T616 1	29.0	Hay/Pasture Mix 20% Protein	10%	1,675	4	12%	164	0	15%	4,235	11
T362 1-8	114.5	Hay/Pasture Mix 20% Protein	10%	1,675	4	10%	136	0	15%	4,235	11
0											
0											
0											
0											
Off-Farm			0%	0		0%	0		0%	0	
		TOTALS-	100%	16,747	35	100%	1,364	3	100%	28,233	62

NUTRIENT BALANCE BASED ON AVAILABLE ACRES

Field Number	Acres	Crop	NUTRIENTS APPLIED			- NUTRIENTS REMOVED			= NUTRIENT BALANCE		
			Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre	Nitrogen, N Lbs/Acre	Phosphorous, P_2O_5 Lbs/Acre	Potassium, K_2O Lbs/Acre
T3 1-5	62.3	Hay/Pasture Mix 20% Protein	291	171	333	512	141	391	-221	30	-58
T338 1-3	26.3	Hay/Pasture Mix 20% Protein	461	286	569	512	141	391	-51	145	178
4	16.9	Hay/Pasture Mix 20% Protein	237	132	274	384	106	294	-147	26	-20
T616 1	29.0	Hay/Pasture Mix 20% Protein	209	119	236	384	106	294	-175	13	-57
T362 1-8	114.5	Hay/Pasture Mix 20% Protein	53	30	59	384	106	294	-331	-76	-234
0											
0											
0											
0											
Off-Farm											

U.S. Department of Agriculture
Natural Resources Conservation Service

ANIMAL WASTE MANAGEMENT WORKSHEET
Version 2.4

4/25/06
STATE: OREGON

CLIENT: **ORAWM**
ASSISTED BY: **CHARLENE TROOST**

CHECKED BY:

ANIMAL WASTE MANAGEMENT SYSTEM UTILIZATION

NUTRIENTS AVAILABLE AFTER STORAGE

Nutrient Source	Type of Operation / Type of Storage Facility	Pounds of Nutrients Available			Percent Nutrients Retained After Storage			Pounds of Nutrients Retained After Storage		
		N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O
Liquids	Dairy / Tank (Uncovered)	38,900	14,621	27,537	70%	85%	85%	27,230	12,428	23,407
Solids	Solids Storage Facility (Roofed)	3,168	937	2,956	75%	90%	90%	2,376	843	2,660
Grazing	NONE	38,257	14,018	27,942	100%	100%	100%	38,257	14,018	27,942

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	Sprinkling	27,230	12,428	23,407	75%	100%	100%	20,423	12,428	23,407
Solids	Broadcast (Incorporated 7 or more days after application)	2,376	843	2,660	70%	100%	100%	1,663	843	2,660
Grazing	Grazing	38,257	14,018	27,942	90%	100%	100%	34,431	14,018	27,942

NUTRIENTS AVAILABLE AFTER DENITRIFICATION

Nutrient Source	Location / Soil Drainage Class	Pounds of Nutrients Available			Percent Nutrients Retained After Denitrification			Pounds of Nutrients Retained After Denitrification		
	Coast /	N	P2O5	K2O	N	P2O5	K2O	N	P2O5	K2O
Liquids	Moderately Well Drained	20,423	12,428	23,407	82%	100%	100%	16,747	12,428	23,407
Solids	Moderately Well Drained	1,663	843	2,660	82%	100%	100%	1,364	843	2,660
Grazing	Moderately Well Drained	34,431	14,018	27,942	82%	100%	100%	28,233	14,018	27,942

PURPOSE (Check all that apply)			
Budget and supply for plant production	x	Utilize manure/organic materials as a nutrient source	x
Minimize agricultural non-point source pollution (water quality)	x	Maintain or improve soil condition	x

Table 1. Field Conditions and Recommendations

CROP SEQUENCE/ROTATION (circle current crop)	EXPECTED YIELD
Hay/Pasture Mix 20% Protein	6

CURRENT SOIL TEST LEVELS (ppm or lb/ac)					
N	P	K	pH	S.O.M.%	EC

RECOMMENDED NUTRIENTS/AMENDMENTS TO MEET EXPECTED YIELD							
N (lbs/ac)		P_2O_5 (lbs/ac)		K_2O (lbs/ac)		LIME	Other	Other
Trial A	Trial B	Trial A	Trial B	Trial A	Trial B			

Table 2. Nutrient Sources

Credits		N		P_2O_5		K_2O	
		pounds per acre					
1. Nitrogen credits from previous legume crop							
2. Residual from long-term manure application							
3. Irrigation water							
4. Other (e.g., atmospheric deposition)							
5. Total Credits-		0		0		0	
Plant-Available Nutrients Applied to Field		N		P_2O_5		K_2O	
(Circle column that is landuser's decision)		Trial A	Trial B	Trial A	Trial B	Trial A	Trial B
6. Credits (from row 5, above)		0	0	0	0	0	0
7. Fertilizer	Starter						
	Other						
8. Manure / Organic Materials (Source-)		53	53	30	30	59	59
9.	Subtotal (sum of lines 6, 7 and 8)	53	53	30	30	59	59
10.	Nutrients Recommended (from Table 1)	0	0	0	0	0	0
11.	Nutrient Status (subtract line 10 from line 9)	53	53	30	30	59	59

If line 11 is a negative number, this is the amount of additional nutrients needed to meet the crop recommendation.
If line 11 is a positive number, this is the amount by which the available nutrients exceed the crop requirements.

PLANNED NUTRIENT APPLICATIONS						
Amount to be Applied (lb/ac)	N		P_2O_5		K_2O	
Method, Form, and Timing of Application						

NUTRIENT MANAGEMENT DESIGN AND SPECIFICATIONS

Producer:	ORAWM	Tract(s): 1000	Field(s): T616 1
Assisted by:	CHARLENE TROOST		Date: April 25, 2006

PURPOSE (Check all that apply)			
Budget and supply for plant production	x	Utilize manure/organic materials as a nutrient source	x
Minimize agricultural non-point source pollution (water quality)	x	Maintain or improve soil condition	x

Table 1. Field Conditions and Recommendations

CROP SEQUENCE/ROTATION (circle current crop)	EXPECTED YIELD
Hay/Pasture Mix 20% Protein	6

CURRENT SOIL TEST LEVELS (ppm or lb/ac)					
N	P	K	pH	S.O.M.%	EC

RECOMMENDED NUTRIENTS/AMENDMENTS TO MEET EXPECTED YIELD							
N (lbs/ac)		P_2O_5 (lbs/ac)		K_2O (lbs/ac)		LIME	Other	Other
Trial A	Trial B	Trial A	Trial B	Trial A	Trial B			

Table 2. Nutrient Sources

Credits		N		P_2O_5		K_2O	
		pounds per acre					
1. Nitrogen credits from previous legume crop							
2. Residual from long-term manure application							
3. Irrigation water							
4. Other (e.g., atmospheric deposition)		0		0		0	
5. Total Credits-		N		P_2O_5		K_2O	
Plant-Available Nutrients Applied to Field (Circle column that is landuser's decision)		Trial A	Trial B	Trial A	Trial B	Trial A	Trial B
6. Credits (from row 5, above)		0	0	0	0	0	0
7. Fertilizer	Starter						
	Other						
8. Manure / Organic Materials (Source-)		209	209	119	119	236	236
9. Subtotal (sum of lines 6, 7 and 8)		209	209	119	119	236	236
10. Nutrients Recommended (from Table 1)		0	0	0	0	0	0
11. Nutrient Status (subtract line 10 from line 9)		209	209	119	119	236	236

If line 11 is a negative number, this is the amount of additional nutrients needed to meet the crop recommendation.
If line 11 is a positive number, this is the amount by which the available nutrients exceed the crop requirements.

PLANNED NUTRIENT APPLICATIONS						
Amount to be Applied (lb/ac)	N		P_2O_5		K_2O	
Method, Form, and Timing of Application						

NUTRIENT MANAGEMENT DESIGN AND SPECIFICATIONS

Producer:	ORAWM	Tract(s): 1000	Field(s): T362 1-8
Assisted by:	CHARLENE TROOST		Date: April 25, 2006

NUTRIENT MANAGEMENT DESIGN AND SPECIFICATIONS

Producer:	ORAWM	Tract(s):	1000	Field(s):	4
Assisted by:	CHARLENE TROOST			Date:	April 25, 2006

PURPOSE (Check all that apply)			
Budget and supply for plant production	x	Utilize manure/organic materials as a nutrient source	x
Minimize agricultural non-point source pollution (water quality)	x	Maintain or improve soil condition	x

Table 1. Field Conditions and Recommendations

CROP SEQUENCE/ROTATION (circle current crop)	EXPECTED YIELD
Hay/Pasture Mix 20% Protein	6

CURRENT SOIL TEST LEVELS (ppm or lb/ac)					
N	P	K	pH	S.O.M.%	EC

RECOMMENDED NUTRIENTS/AMENDMENTS TO MEET EXPECTED YIELD							
N (lbs/ac)		P_2O_5 (lbs/ac)		K_2O (lbs/ac)		LIME	Other	Other
Trial A	Trial B	Trial A	Trial B	Trial A	Trial B			

Table 2. Nutrient Sources

Credits		N		P_2O_5		K_2O	
		pounds per acre					
1. Nitrogen credits from previous legume crop							
2. Residual from long-term manure application							
3. Irrigation water							
4. Other (e.g., atmospheric deposition)							
5. Total Credits-		0		0		0	
Plant-Available Nutrients Applied to Field		N		P_2O_5		K_2O	
(Circle column that is landuser's decision)		Trial A	Trial B	Trial A	Trial B	Trial A	Trial B
6. Credits (from row 5, above)		0	0	0	0	0	0
7. Fertilizer	Starter						
	Other						
8. Manure / Organic Materials (Source-)		237	237	132	132	274	274
9. Subtotal (sum of lines 6, 7 and 8)		237	237	132	132	274	274
10. Nutrients Recommended (from Table 1)		0	0	0	0	0	0
11. Nutrient Status (subtract line 10 from line 9)		237	237	132	132	274	274

If line 11 is a negative number, this is the amount of additional nutrients needed to meet the crop recommendation.
If line 11 is a positive number, this is the amount by which the available nutrients exceed the crop requirements.

PLANNED NUTRIENT APPLICATIONS						
Amount to be Applied (lb/ac)	N		P_2O_5		K_2O	
Method, Form, and Timing of Application						

NUTRIENT MANAGEMENT DESIGN AND SPECIFICATIONS

Producer: ORAWM	Tract(s): 1000	Field(s): T338 1-3	
Assisted by: CHARLENE TROOST		Date: April 25, 2006	

PURPOSE (Check all that apply)			
Budget and supply for plant production	x	Utilize manure/organic materials as a nutrient source	x
Minimize agricultural non-point source pollution (water quality)	x	Maintain or improve soil condition	x

Table 1. Field Conditions and Recommendations

CROP SEQUENCE/ROTATION (circle current crop)	EXPECTED YIELD
Hay/Pasture Mix 20% Protein	8

CURRENT SOIL TEST LEVELS (ppm or lb/ac)					
N	P	K	pH	S.O.M.%	EC

RECOMMENDED NUTRIENTS/AMENDMENTS TO MEET EXPECTED YIELD								
N (lbs/ac)		P_2O_5 (lbs/ac)		K_2O (lbs/ac)		LIME	Other	Other
Trial A	Trial B	Trial A	Trial B	Trial A	Trial B			

Table 2. Nutrient Sources

Credits		N		P_2O_5		K_2O	
		pounds per acre					
1. Nitrogen credits from previous legume crop							
2. Residual from long-term manure application							
3. Irrigation water							
4. Other (e.g., atmospheric deposition)							
5. Total Credits-		0		0		0	
Plant-Available Nutrients Applied to Field (Circle column that is landuser's decision)		N		P_2O_5		K_2O	
		Trial A	Trial B	Trial A	Trial B	Trial A	Trial B
6. Credits (from row 5, above)		0	0	0	0	0	0
7. Fertilizer	Starter						
	Other						
8. Manure / Organic Materials (Source-)		461	461	286	286	569	569
9.	Subtotal (sum of lines 6, 7 and 8)	461	461	286	286	569	569
10.	Nutrients Recommended (from Table 1)	0	0	0	0	0	0
11.	Nutrient Status (subtract line 10 from line 9)	461	461	286	286	569	569

If line 11 is a negative number, this is the amount of additional nutrients needed to meet the crop recommendation.
If line 11 is a positive number, this is the amount by which the available nutrients exceed the crop requirements.

PLANNED NUTRIENT APPLICATIONS						
Amount to be Applied (lb/ac)	N		P_2O_5		K_2O	
Method, Form, and Timing of Application						

NUTRIENT MANAGEMENT DESIGN AND SPECIFICATIONS

Producer:	ORAWM	Tract(s):	1000	Field(s):	T3 1-5
Assisted by:	CHARLENE TROOST			Date:	April 25, 2006

PURPOSE (Check all that apply)			
Budget and supply for plant production	x	Utilize manure/organic materials as a nutrient source	x
Minimize agricultural non-point source pollution (water quality)	x	Maintain or improve soil condition	x

Table 1. Field Conditions and Recommendations

CROP SEQUENCE/ROTATION (circle current crop)	EXPECTED YIELD
Hay/Pasture Mix 20% Protein	8

CURRENT SOIL TEST LEVELS (ppm or lb/ac)

N	P	K	pH	S.O.M.%	EC
NA	87-120	227-459	6.1-6.4		

RECOMMENDED NUTRIENTS/AMENDMENTS TO MEET EXPECTED YIELD

N (lbs/ac)		P_2O_5 (lbs/ac)		K_2O (lbs/ac)		LIME	Other	Other
Trial A	Trial B	Trial A	Trial B	Trial A	Trial B			
200		0		0				

Table 2. Nutrient Sources

Credits	N	P_2O_5	K_2O
	pounds per acre		
1. Nitrogen credits from previous legume crop			
2. Residual from long-term manure application			
3. Irrigation water			
4. Other (e.g., atmospheric deposition)			
5. Total Credits-	0	0	0

Plant-Available Nutrients Applied to Field (Circle column that is landuser's decision)		N		P_2O_5		K_2O	
		Trial A	Trial B	Trial A	Trial B	Trial A	Trial B
6. Credits (from row 5, above)		0	0	0	0	0	0
7. Fertilizer	Starter						
	Other						
8. Manure / Organic Materials (Source-)	Dairy	291	0	171	0	333	0
9. Subtotal (sum of lines 6, 7 and 8)		291	0	171	0	333	0
10. Nutrients Recommended (from Table 1)		200	0	0	0	0	0
11. Nutrient Status (subtract line 10 from line 9)		91	0	171	0	333	0

If line 11 is a negative number, this is the amount of additional nutrients needed to meet the crop recommendation.
If line 11 is a positive number, this is the amount by which the available nutrients exceed the crop requirements.

PLANNED NUTRIENT APPLICATIONS

Amount to be Applied (lb/ac)	N	206	P_2O_5	177	K_2O	340

Method, Form, and Timing of Application

Recommended application rates are based on OSU Extension Recommendations.
No commercial fertilizer should be applied as all nutrients can be supplied by manure applications except for Sulfur, Magnesium, Zinc and Boron which should be applied in accordance with the fertilizer guide and soil tests.
Use nutrient concentrations in storage to determine big gun travel rates to apply 100 pounds per acre of nitrogen in March or April and again in May.
Use nutrient concentration in storage to determine solids spreader loads per acre to apply 200 pounds per acre of nitrogen in March or April. No more than a total of 200 pounds of nitrogen per acre should be applied.
Score card soil testing should be done in the fall to insure excessive nitrates are not available for leaching.
Manure should be reduced or not applied if soil tests show Phosphorous and Potassium concentrations continue to increase over time and approach very high levels as determined by OSU Extension.

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
Tillamook

11/27/96
(503)842-2848

CONSERVATION PLAN

Client: Allen, George George Allen
Assisted By: Robert A. Pedersen

LAND UNITS		PLANNED			APPLIED		PLANNED CONSERVATION TREATMENT
TRACT	FIELD	AMOUNT	MONTH	YEAR	AMOUNT	DATE	
							Farmstead
3	F1	2.9Ac					
338	F2	1.8Ac					
3	F1	45200.0Cf	09	1993	45240.0Cf	01/19/1994	ABOVE GROUND LIQUID MANURE TANK An above ground liquid manure tank will be constructed to increase liquid manure storage capacity. The tank will be an approved SCS design and installed in accordance with SCS specifications. A 60'x 16' above ground reinforced concrete tank will be installed. This tank in combination with the existing liquid manure tanks will store the liquid manure for the 294-1000 units for 47 days.
3	F1	1.0No	09	1993	1.0No	02/24/1994	AGITATOR An agitator will be professionally installed in the above ground liquid manure tank to prevent solid manure buildup in the bottom of the tank. INOPERATIVE
338	F2	1.0No	09	1985	1.0No	11/09/1982	AGITATOR/PUMP An agitator/pump will be professionally installed in the liquid manure tank for proper handling and managing the stored manure.
338	F2	6434.0Cf	10	1982	6434.0Cf	10/01/1982	BELOW GROUND LIQUID MANURE TANK A below ground liquid manure tank will be constructed to increase liquid manure storage capacity. The liquid manure tank will be a reinforced concrete below ground. It will be 32'x 8'. The tank will be installed in accordance with an approved SCS design and in accordance with SCS specification. This tank will store the manure from the 74-1000 lb units for 102 days. Some manure from the above ground liquid manure tank will be transfered to this tank if additional storage is needed at the dairy operation.
3	F1	21344.0Cf	09	1968	21344.0Cf	09/10/1968	BELOW GROUND LIQUID MANURE TANK A below ground liquid manure tank exists. Three below ground reinforced concrete tanks have been installed. The tanks are 35'x 7.5',40'x 11'x'5 and a 45'x 7.5. These liquid manure tanks will store the manure from the existing 294-1000 lb units for 15 days.
338	F2	1.0Cy	10	1982	9.4Cy	02/25/1984	CURBING A livestock and machinery passable concrete curb will be installed to prevent manure runoff. Curbing will be installed on open sides of roof over the liquid manure tank.

CONSERVATION PLAN

Client: Allen, George
Assisted By: Robert A. Pedersen

George Allen

LAND UNITS		PLANNED			APPLIED		
TRACT	FIELD	AMOUNT	MONTH	YEAR	AMOUNT	DATE	PLANNED CONSERVATION TREATMENT
3	F1	1.0No	09	1993	1.0No	02/24/1994	PUMP A pump will be professionally installed to transfer manure from the above ground liquid manure tank to the fields in a non-polluting manner. The pump will also be used to transfer liquid manure to the 32'x 8' below ground reinforced concrete liquid manure at tract #338 farmstead.
338	F2	2400.0Sf	09	1986	2400.0Sf	06/26/1982	ROOF A roof will be constructed over the manure accumulation slab. The roof will be guttered and downspouted. Downspouts will not be spaced more than 25 feet apart. Roof will be constructed over the existing slab, 40'x 60' on west side of the barn.
338	F2	2115.0Sf	08	1984	2115.0Sf	08/02/1982	ROOF A roof will be constructed over the manure accumulation slab. The roof will be guttered and downspouted. Downspouts will not be spaced more than 25 feet apart. The roof will be constructed over an existing 45'x 40' slab on the south side of the barn.
338	F2	1600.0Sf	10	1982	1720.0Sf	01/27/1984	ROOF A roof will be constructed over the existing liquid manure tank to keep rainwater from entering the liquid manure tank. Roof will be guttered and downspouted. Downspouts will not be spaced more than 25 feet apart. Approximate roof size 40'x 40' to be installed over 32' diameter liquid tank.
338	F2	13362.0Cf	10	1982	13362.0Cf	02/04/1983	SOLID MANURE STORAGE FACILITY A solid manure storage facility with roof, gutters and downspouts will be constructed to increase solid manure storage capacity. A 53.6'x 40'x 6' facility will be installed. The facility will be installed in accordance with an approved SCS design and in accordance with SCS specification. This facility will store the solid manure from the 74-1000 lb units for 270 days.
3	F1	1.0no	09	1993	1.0no	02/24/1994	WASTE MANAGEMENT SYSTEM
338	F2	1.0no	11	1983	1.0no	03/30/1993	The waste management system consists of structural practices for collecting, storing and applying waste to pasturelands. These practices will prevent pollution by providing an adequate waste management system at the animal confinement

CONSERVATION PLAN

Client: Allen, George
Assisted By: Robert A. Pedersen

George Allen

LAND UNITS		PLANNED			APPLIED		
TRACT	FIELD	AMOUNT	MONTH	YEAR	AMOUNT	DATE	PLANNED CONSERVATION TREATMENT
							operation until wastes are applied to pastures.
3	F1	2220.0Ft	09	1993	2279.0Ft	02/23/1994	WASTE TRANSFER PIPE A 5-inch PVC Class Code 125 waste transfer pipe will be installed. Pipe will transfer liquid manure from the above ground liquid manure tank to the below ground liquid manure tank at the farmstead at track #338.

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
Tillamook

11/27/96
(503)842-2848

CONSERVATION PLAN

Client: Allen, George
Assisted By: Robert A. Pedersen

George Allen

LAND UNITS		PLANNED			APPLIED		
TRACT	FIELD	AMOUNT	MONTH	YEAR	AMOUNT	DATE	PLANNED CONSERVATION TREATMENT
							Pasture
3	1, 2, 3, 4, 5	60.3Ac					
338	1, 2, 3, 4	38.2Ac					
395	1	17.9Ac					
583	1	12.6Ac					
3	1	14.4ac	09	1998			PASTURE AND HAYLAND MANAGEMENT
	2	14.8ac	09	1998			Pastures will be managed in accordance with the enclosed Job
	3	25.3ac	09	1998			Sheet 2: Pasture Management.
	4	3.9ac	09	1998			
	5	1.9ac	09	1998			
338	1	11.3ac	09	1998			
	2	11.7ac	09	1998			
	3	2.1ac	09	1998			
	4	13.1ac	09	1998			
395	1	17.9ac	09	1998			
583	1	12.6ac	09	1998			
3	1	14.4ac	10	1993			WASTE UTILIZATION
	2	14.8ac	10	1993			Manure will be applied to pastures and or hayland in
	3	25.3ac	10	1993			accordance with the enclosed Waste Utilization
	4	3.9ac	10	1993			Specification.
	5	1.9ac	10	1993			
338	1	11.3ac	10	1993			
	2	11.7ac	10	1993			
	3	2.1ac	10	1993			
	4	13.1ac	10	1993			
395	1	17.9ac	10	1993			
583	1	12.6ac	10	1993			

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
Tillamook

Nov 27, 1996
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CONSERVATION EFFECTS WORKSHEET

CLIENT: Allen, George
BUSINESS: George Allen
ADDRESS:
CITY: STATE: ZIP:

LAND UNIT LABEL	Tract	Field	Subfld
Farmstead	3	F1	
Farmstead	338	F2	

EXISTING OR CURRENT TREATMENT	PROPOSED OR ALTERNATIVE TREATMENT	IMPACTS
The major landuse is headquarters. The barn and animal waste storage structures are located within this landuse. The landscape is characterized by floodplains and sloping foothills. The soils vary from well drained to poorly drained. The average precipitation is 40 to 90 inches. Generally, fifteen days of manure storage are available. There is a moderate to high risk level of surface water pollution from the animal confinement operation due to the high rainfall and unroofed manure accumulation areas. Some solid manure may be stacked on the ground outside of the barn. An open water course is within 300 feet of the animal confinement operation and/or the operation is subject to flooding.		(THIS COLUMN SHOWS THE CHANGES IN THE RESOURCE SITUATION OR CONDITION THAT CAN BE EXPECTED ON THIS LAND UNIT IF THIS PROPOSED TREATMENT IS FULLY IMPLEMENTED)

EXISTING OR CURRENT PRACTICES	PROPOSED OR ALTERNATIVE PRACTICES
	ABOVE GROUND LIQUID MANURE TANK
	AGITATOR
	AGITATOR/PUMP
	BELOW GROUND LIQUID MANURE TANK
	CURBING
	PUMP
	ROOF
	SOLID MANURE STORAGE FACILITY
	WASTE MANAGEMENT SYSTEM
	WASTE TRANSFER PIPE

EFFECT CATEGORY EFFECTS OF EXISTING OR CURRENT TREATMENT	EFFECTS OF THIS PROPOSED TREATMENT	IMPACTS OF THIS PROPOSED TREATMENT
Financial Sustainability - Narrative High capital investment required for installing and adequate animal waste management system.	FSA Long-Term Agreement reduced the capital investment required to install an adequate waste management system.	Financial sustainability was maintained by having cost-sharing assistance available to install an adequate animal waste management system. A possible fine

CONSERVATION EFFECTS WORKSHEET

CLIENT: Allen, George
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CITY: STATE: ZIP:

EFFECT CATEGORY EFFECTS OF EXISTING OR CURRENT TREATMENT	EFFECTS OF THIS PROPOSED TREATMENT	IMPACTS OF THIS PROPOSED TREATMENT
		would be avoided.
Nut. & Organics in Grndwater - Narrative A lack of an adequate animal waste management system results in manure application to pastures when soil and climatic conditions are not favorable. A potential for nutrients in ground water exists.	An animal waste management system that allows the application of manure to pastures when soil and climatic conditions are favorable.	No groundwater pollution associated with this operation is anticipated.
Nut. & Organics in Sur. Water - Narr. Potential for high levels of animal waste in surface water exists because the existing animal waste management sustem does not allow the flexibility to apply manure when the soil and climatic conditions are favorable.	Best management practices installed and managed such that animal waste can be applied when soil and climatic conditions are favorable.	No impact on surface water quality from this operation is anticipated if the practices are managed properly.
Sur. Water Contam. - Other - Narrative A probability exists that the dairy operation might be a source of animal waste and fecal coliform pollution.	Reduced source of surface water contamination.	Surface water quality degradation from this operation is not anticipated if the practices are managed properly.

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CONSERVATION EFFECTS WORKSHEET

CLIENT: Allen, George
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ADDRESS:
CITY: STATE: ZIP:

LAND UNIT LABEL	Tract	Field	Subfld
Pasture	3	1	
Pasture	3	2	
Pasture	3	3	
Pasture	3	4	
Pasture	3	5	
Pasture	338	1	
Pasture	338	2	
Pasture	338	3	
Pasture	338	4	
Pasture (Leased)	395	1	
Pasture (Leased)	583	1	

EXISTING OR CURRENT TREATMENT

The major landuse is pasture and the enterprises are primarily dairy operations. The landscape is characterized by floodplains and sloping foothills. The soils are well drained to poorly drained. The forage yield is 2 tons to 6 tons per acre per year. The low to medium production is due to low to medium levels of management affected by overstocking, overgrazing, and low producing forage species. There is a high risk of surface and/or groundwater pollution because of manure application, flooding, ponding, and leaching during inclement weather and unfavorable soil conditions.

PROPOSED OR ALTERNATIVE TREATMENT

The major landuse is pasture and the enterprises are primarily dairy operations. The landscape varies from floodplains to sloping foothills. The soils are well drained to poorly drained. The forage yield is 2 tons to 6 tons per acre per year. The amount of production is due to low to medium level of management affected by overstocking, overgrazing, and low producing forage species. There is a high risk of surface and/or groundwater pollution because of manure application, flooding, ponding, and leaching during inclement weather and unfavorable soil conditions. This resource management system will increase forage production and improve surface and groundwater quality.

IMPACTS

(THIS COLUMN SHOWS THE CHANGES IN THE RESOURCE SITUATION OR CONDITION THAT CAN BE EXPECTED ON THIS LAND UNIT IF THIS PROPOSED TREATMENT IS FULLY IMPLEMENTED)

EXISTING OR CURRENT PRACTICES

PROPOSED OR ALTERNATIVE PRACTICES

PASTURE AND HAYLAND MANAGEMENT
WASTE UTILIZATION

EFFECT CATEGORY EFFECTS OF EXISTING OR CURRENT TREATMENT	EFFECTS OF THIS PROPOSED TREATMENT	IMPACTS OF THIS PROPOSED TREATMENT
Nut. & Organics in Grndwater - Narrative Slight potential for nitrates in the ground water.	Nitrate leaching not anticipated.	No degradation of the groundwater anticipated.
Nut. & Organics in Sur. Water - Narr.		

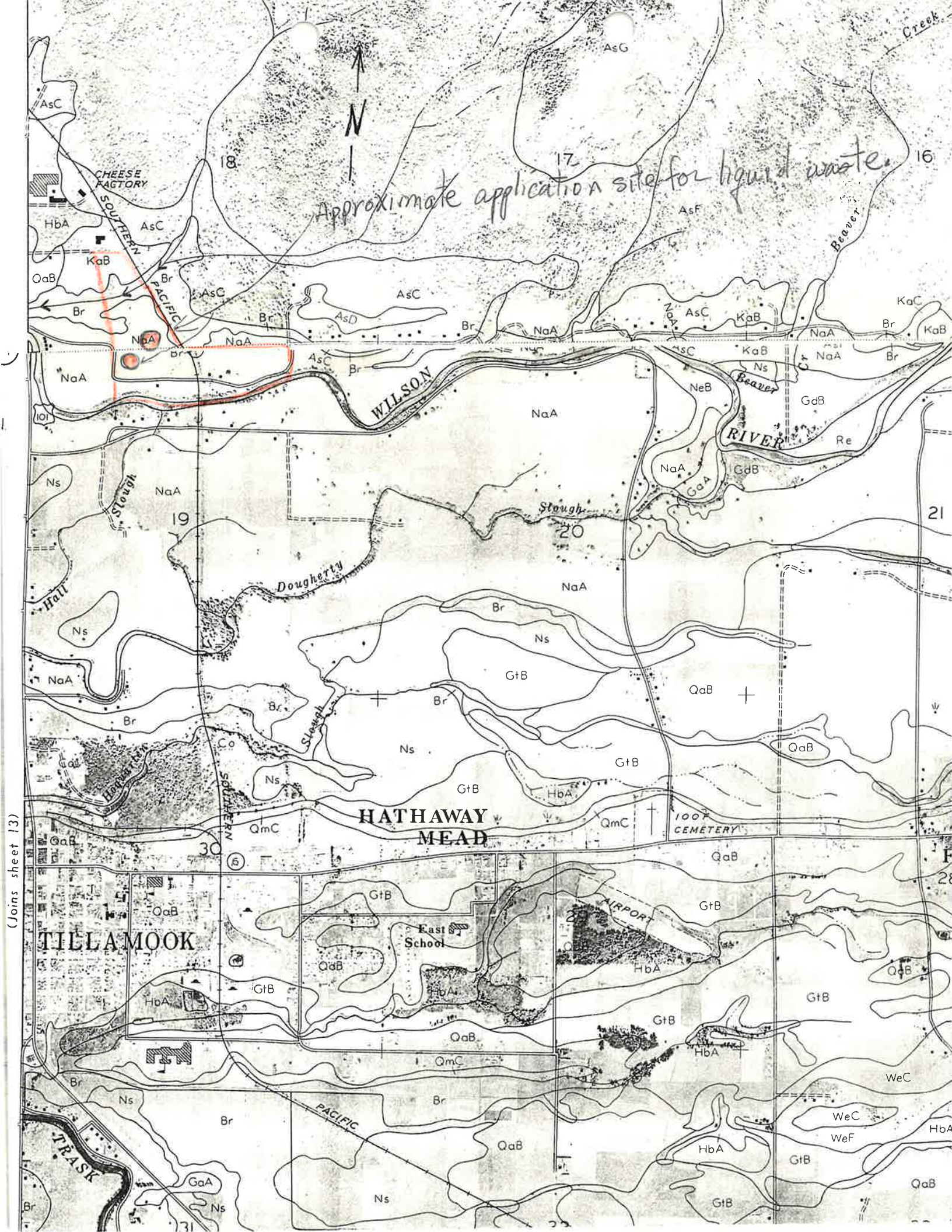
U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE
Tillamook

Nov 27, 1996
(503)842-2848

CONSERVATION EFFECTS WORKSHEET

CLIENT: Allen, George
BUSINESS: George Allen
ADDRESS:
CITY: STATE: ZIP:

EFFECT CATEGORY EFFECTS OF EXISTING OR CURRENT TREATMENT	EFFECTS OF THIS PROPOSED TREATMENT	IMPACTS OF THIS PROPOSED TREATMENT
Potential manure runoff and fecal coliform in the surface water.	No manure runoff and fecal coliform in the surface water anticipated.	No degradation of the surface water from the pastures anticipated.
Plant Productivity - Narrative Current forage yeilds are adequate to maintain dairy operations production and utilize the manure applied nitrates.	Six tons per acre per year anticipated. This yield will maintain the dairy operation production and utilize the nitrogen in the manure applied to the pastures.	Forage production is at least 6 tons per acre per year which will maintain the present level of production and utilize the nitrogen in the manure applied to the pastures.
Plants Health & Vigor - Narrative Plants are healthy and vigorous enough to maintain forage production and utilize the manure applied nitrates.	No degradation in the plants health or vigor.	Plant health and vigor is maintained.



(Joins sheet 13)