

Fact Sheet for State Waste Discharge Permit ST0501319

Terramar Brewery

Permit Effective Date: January 1, 2020

Purpose of this fact sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed State Waste Discharge Permit for Terramar Brewery that will allow discharge of wastewater to the designated land treatment area (approximately 2.5 acres north of the site buildings).

State law requires any industrial facility to obtain a permit before discharging waste or chemicals to waters of the state, which includes groundwater.

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for Terramar Brewery, State Waste Discharge Permit No. ST0501319, were available for public review and comment from August 28, 2019, until the close of business September 27, 2019. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement Information**.

Terramar Brewery reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions about the facility's location, history, product type or production rate, discharges or receiving water prior to publishing this draft fact sheet for public notice.

After the public comment period closes, Ecology will summarize substantive comments and our responses to them. Ecology will include our summary and responses to comments to this fact sheet as **Appendix E - Response to Comments**, and publish it when we issue the final State Waste Discharge Permit. Ecology generally will not revise the rest of the fact sheet. The full document will become part of the legal history contained in the facility's permit file.

Summary

The Terramar Brewery facility is a new microbrewery and distillery located on a former brownfield site at 5712 Gilkey Street, Edison, Washington. The location is unique in that it is surrounded on three sides by Edison Slough, a marine water body near the land application area (Figure 1). For this reason the site will require careful application and monitoring of its wastewater land treatment so as not to impact groundwater or surface water.

The facility is a former slaughterhouse and used wood dealer. The owner is modifying the existing buildings to include areas for the brewing and distilling equipment, a 45-seat tasting room, a 12-seat take-out wood-fired pizza operation, an art studio, a craft coffee roasting operation, an outdoor recreation area, and an office.

Plans are for the former wood dealer area to be top soiled and seeded for use as an outdoor recreation area. This area will also serve as the land treatment site for all facility process wastewater. Sanitary wastewater from bathrooms and kitchen areas is handled by a separate sanitary septic system.

Initial operations at Terramar Brewery will be production of craft beers. It is anticipated that operations will start small and ramp up over a five-year period. Anticipated maximum production at the five-year build-out is 500 barrels/year of beer, 58 barrels of hard apple cider, 1500 proof gallons of whiskey, 500 proof gallons of vodka, 300 proof gallons of gin, 175 proof gallons of apple brandy, and 100 proof gallons of fruit liquors.

Terramar Brewery submitted a five-year build-out plan with their permit. This plan has a projected average wastewater flow of approximately 467 gallons per day (gpd) in year one growing to an average of 1,325 gpd by year five.

Wastewater can be generated by removal of processed materials (trub), off-spec product, and equipment/facility wash-down. Side-streaming of high strength wastewaters will be handled separately from the land treatment wastewater. High strength wastes such as trub, spent yeast, and off-spec product will be collected at the point of generation and stored in IBC totes for hauling and off-site disposal. Wet spent grains and stillage will also be hauled off-site for use as animal feed.

Wastewater generated by cleaning and sanitizing vessel interiors and exteriors, floor cleaning, packaging, and other processes directly related to brewing and distilling will be land treated.

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I. Introduction

The Legislature defined Ecology's authority and obligations for the wastewater discharge permit program in the Water Pollution Control law, chapter 90.48 RCW (Revised Code of Washington).

Ecology adopted rules describing how it exercises its authority:

- State waste discharge program (chapter 173-216 WAC).
- Water quality standards for ground waters of the state of Washington (chapter 173-200 WAC).
- Submission of plans and reports for construction of wastewater facilities (chapter 173-240 WAC);

These rules require any industrial facility owner/operator to obtain a State Waste Discharge Permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for performance requirements imposed by the permit.

Under the State Waste Discharge Permit Program and in response to a complete and accepted permit application, Ecology generally prepares a draft permit and accompanying fact sheet, and makes it available for public review before final issuance. If the volume of the discharge has not changed or if the characteristics of the discharge have not changed, Ecology may choose not to issue a public notice. When Ecology publishes an announcement (public notice), it tells people where they can read the draft permit, and where to send their comments, during a period of thirty days. (See **Appendix A - Public Involvement Information** for more detail about the public notice and comment procedures). After the public comment period ends, Ecology may make changes to the draft State Waste Discharge Permit in response to comment(s). Ecology will summarize the responses to comments and any changes to the permit in **Appendix E**.

II. Background Information

Table 1. General Facility Information

Facility Information	
Applicant	Chris Barker
Facility Name and Address	5712 Gilkey Street Edison, WA 98232
Contact at Facility	Name: John Mercer Telephone #: 541-350-4261
Responsible Official	Name: Chris Barker Title: Owner Address: PO Box 3000, Bow, WA, 98232 Telephone #: 360-510-6747
Industry Type	Craft Brewery
Type of Treatment	pH adjustment and land treatment
SIC Codes	2082, 2085
NAIC Codes	312120, 312140
Facility Location	Latitude: 48.5639 Longitude: -122.4434

Legal Description of Application Area	Section, township, range: NW ¼, SW ¼, Section 33, T36N, R03E Latitude: 48.5639 Longitude: -122.4434
Groundwater Monitoring Well Information	
	Ecology tag # Latitude: TBD (NAD83) Longitude: TBD
	Ecology tag # Latitude: TBD (NAD83) Longitude: TBD
	Ecology tag # Latitude: TBD (NAD83) Longitude: TBD

Permit Status	
Issuance Date of Permit	
Application for Permit Renewal Submittal Date	
Date of Ecology Acceptance of Application	October 9, 2018

Inspection Status	
Date of Last Non-sampling Inspection Date	

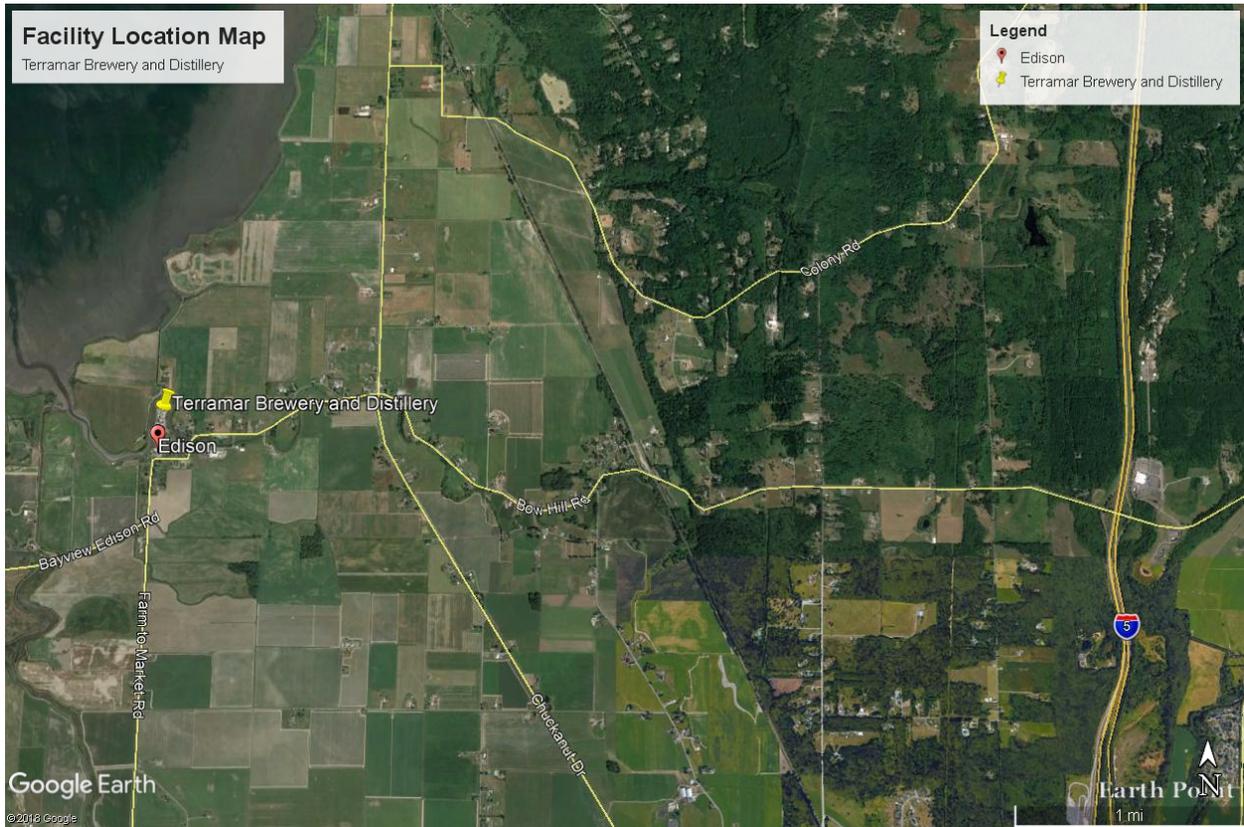


Figure 1. Facility Location Map

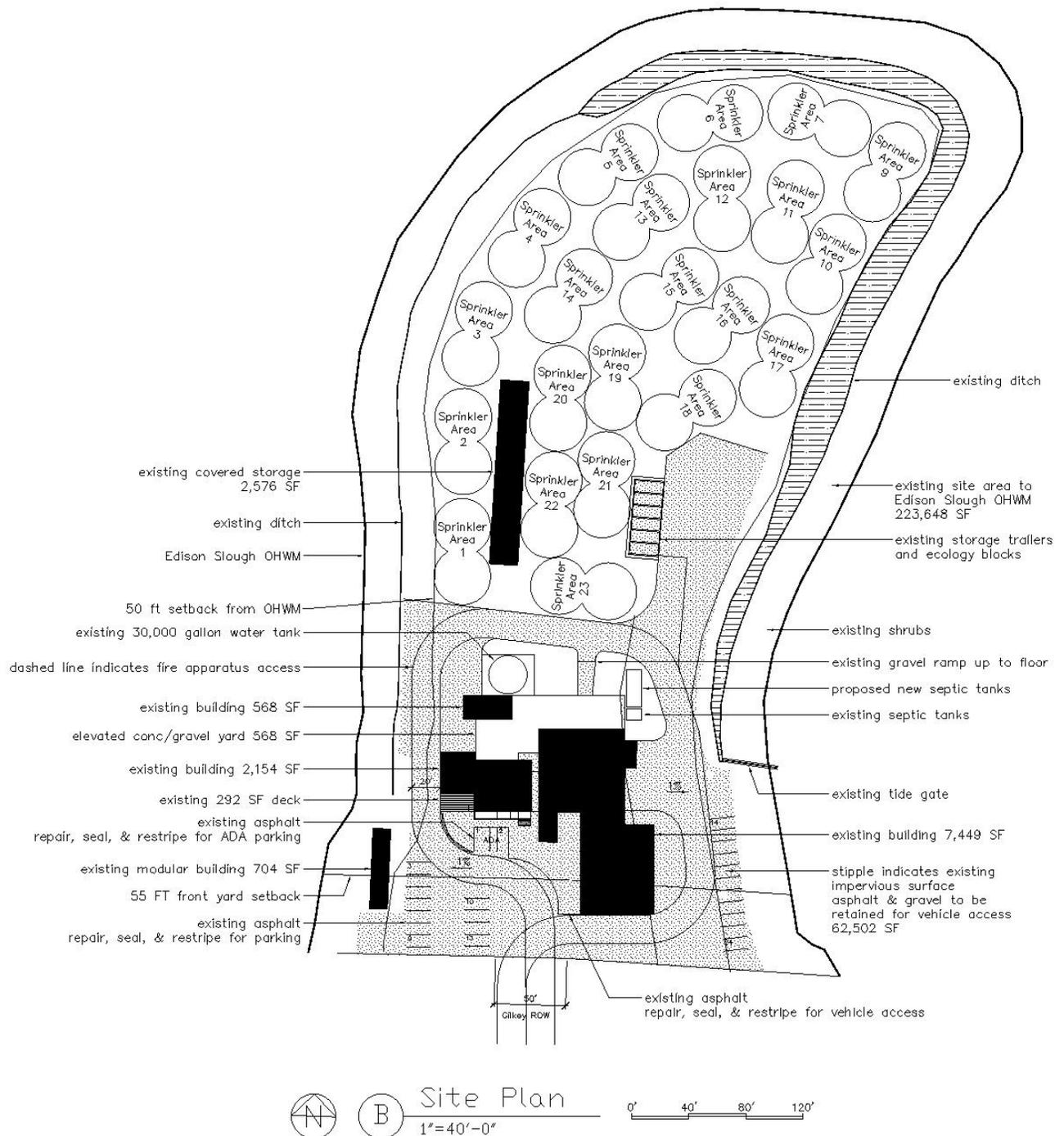


Figure 2. Site Layout

A. Facility description

History

The Terramar Brewery facility is a new microbrewery and distillery located on a former brownfield site at 5712 Gilkey Street, Edison, Washington. The location is unique in that it is surrounded on three sides by Edison Slough (Figure 1). For this reason the site will require careful application and monitoring of its wastewater land treatment so as not to impact groundwater or surface water.

The facility is a former slaughterhouse and used wood dealer. The owner is modifying the existing buildings to include areas for the brewing and distilling equipment, a 45-seat tasting room, a 12-seat take-out wood-fired pizza operation, an art studio, a craft coffee roasting operation, an outdoor recreation area, and an office.

Building modifications have been ongoing since 2016 with an estimated completion date of summer 2019. Appendix D Figure D-1 shows the proposed facility layout. Beer will primarily be consumed on-site from kegs, while spirits will be bottled and distributed with minor on-site consumption.

The used wood dealer used the outdoor area at the rear of the site for storing and cutting of used wood. Wood came from the dismantling of old barns as well as from upgrades to older structures. The wood was in various sizes and lengths that were cut to customer orders. This operation has relocated to another site in Edison.

Plans are for the former wood dealer area to be top soiled and seeded for use as an outdoor recreation area. This area will also serve as the land treatment site for all facility process wastewater. Sanitary wastewater from bathrooms and kitchen areas is handled by a separate sanitary septic system.

Industrial process(es)

Initial operations at Terramar Brewery will be production of craft beers. It is anticipated that operations will start small and ramp up over a five-year period. Anticipated maximum production at the five-year build-out is 500 barrels/year of beer, 58 barrels of hard apple cider, 1500 proof gallons of whiskey, 500 proof gallons of vodka, 300 proof gallons of gin, 175 proof gallons of apple brandy, and 100 proof gallons of fruit liquor's. Figure D-2 in Appendix D shows a process flow diagram for brewing and distilling operations.

Raw material will be received in sacks, including malted barley, hops, yeast, and adjuncts (wheat, oat, rye, and barley). Materials received in other containers will include botanicals, fruit puree, and apple cider.

Terramar Brewery submitted a five-year build-out plan with their permit. This plan has a projected average wastewater flow of approximately 467 gallons per day (gpd) in year one growing to an average of 1,325 gpd by year five.

Wastewater can be generated by removal of processed materials (trub), off-spec product, and equipment/facility wash-down. Side-streaming of high strength wastewaters will be handled separately from the land treatment wastewater. High strength wastes such as trub,

spent yeast, and off-spec product will be collected at the point of generation and stored in IBC totes for hauling and off-site disposal. Wet spent grains and stillage will also be hauled off-site for use as animal feed.

Wastewater generated by cleaning and sanitizing vessel interiors and exteriors, floor cleaning, packaging, and other processes directly related to brewing and distilling will be land treated.

There may be seasonal variations in wastewater components based on which fruits are in season. However, these variations will be minor compared to the beer wastewater.

Terramar Brewery is a small craft brewery and distillery. At full build-out, Terramar and the collocated operations will likely employ about 20 to 25 people.

It is anticipated that Terramar Brewery will operate 10 hours a day, 6 days a week. This will be a year-round operation.

The only chemicals stored on-site will be those associated with the cleaning of equipment. All chemicals will be stored in correctly sized and labeled containers.

All equipment being installed is new. All piping for the land treatment system will also be new. Only a former septic tank and the former blood tank will be reused for processing wastewater.

Terramar Brewery has undergone an extensive review and partnership with the Washington Department of Ecology's Technical Resources for Engineering Efficiency (TREE) team to look at sustainability issues with everything from power usage to material packaging.

Wastewater treatment processes (prior to land treatment)

All process wastewater will be collected by a trench drain in the brewing and distilling area. This trench drain discharges to a 1,000-gallon underground tank. A bag filter in the trench drain and a sock filter on the discharge into the 1,000-gallon tank will minimize solids entering the system.

Vessel cleaning and sanitizing (CIP) wastewater will be collected and treated for pH adjustment in an IBC tote before discharge to the 1,000-gallon tank. The system also has a "catastrophe tank" in the event wastewater needs to be diverted from the primary system. This dead-end tank will be pumped out and trucked off-site for disposal.

Totes and drains gravity flow to a two-chambered 1,000-gallon underground tank (former septic tank). Here an automated pH adjustment system will maintain tank contents at a pH between 6 and 9. After wastewater has reached the appropriate pH, it is transferred to a 30,000-gallon underground concrete storage tank (the former blood tank). From this tank a sump pump will supply water to irrigate a new 23-zone sprinkler system covering 2.5 acres. Wastewater will be irrigated for grass growth and land treatment.

During wet weather periods, Terramar Brewery has the capacity to store up to 30,000 gallons. If the need arises, pH-adjusted wastewater can be discharged to an on-site trenchless drain field.

Projected wastewater volumes for the first year of operations will average 467 gallons per day (gpd). This volume could increase to 1,325 gpd at the five-year build out.

Land treatment and distribution system (spray field)

This will be a new system installed specifically for the purpose of optimal distribution of wastewater. The proposed system will use K-Line Max⁸⁰ impact sprinklers with a 20-foot radius. The 2.5 acres of the land treatment area will be served by 23 sprinkler zones. Each zone will have 2 sprinkler heads covering approximately 2,513 ft² with 1,567 gallons of wastewater.

The top 2 to 4 feet of the application area is fill material consisting of coarse sand and gravel. Beneath the fill is the native soil. This is identified by the National Resources Conservation Service (NRCS) of the United States Department of Agriculture as Mount Vernon Very Fine Sandy Loam. This is a dark brown loamy fine sand of hydrologic class C that is moderately well drained.

Application of wastewater during the winter months will be limited to days where applied wastewater will primarily be evaporated. The restriction is no more than 1-inch per week including precipitation. A week of precipitation is defined as the total precipitation for the seven days prior to the wastewater application. Wastewater application is also restricted if precipitation is forecast within the next 36 hours.

The two major contaminants of concern with this wastewater are Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS). In high concentrations both these constituents can negatively impact soil infiltration.

As this is a new facility and because of its unique location, surrounded on three sides by Edison Slough, the Permittee has done extensive investigation into critical areas and their required setbacks. The critical area assessment showed that a 150-foot wetland setback was not feasible with the proposed operations. However, a 100-foot fish and wildlife setback could be maintained. The Permittee also plans to include 0.75 acres of mitigation planting between the surface water ditch and the land treatment area. Appendix D contains figures showing the documented setbacks from the critical area assessment.

Supplemental water, if needed, is available from the Blanchard Edison Water Association.

The new system will be programed to apply no more than one inch of water per week to the entire land treatment area. Actual wastewater is estimated at 0.14 inches per week.

Discharge to the sprinkler system will be measured with a magnetic flow meter on the outlet of the 30,000-gallon tank. Initially the system will collect data at 2-minute intervals for pH, gallons per minute, gpd, tank level, and pump on/off cycles. The control system allows for remote access, so employees can monitor from the office, at home, or on a mobile device. Brewery Wastewater Design staff in Colorado also have access to this data to assist with troubleshooting, should it become necessary.

Solid wastes

There will be two types of solid waste generated by operations at Terramar Brewery. Solid waste from the brewing and distilling process will consist of trub, spent yeast, off-spec product, wet spent grains, and stillage. There are arrangements for the hauling and off-site disposal of these waste materials.

The second type of solid waste will be typical municipal refuse from the tasting room, pizza operation, and the packaging area. This waste will be collected and disposed by the local trash vendor.

Sanitary waste

All sanitary waste and kitchen water from on-site facilities will discharge to a new sanitary septic system. This system will be independent of the wastewater system to avoid potential cross contamination of sanitary and brewing wastewaters.

B. Description of the groundwater

Groundwater at the facility is shallow. During the winter months the water table is less than five feet below the ground surface. The groundwater likely discharges to Edison Slough, but is not in direct hydrologic connection. The groundwater does not fluctuate with the tidal changes in the slough. This may be the result of the constant head maintained in the surface water ditch that surrounds much of the site.

Permit writers in some cases must decide if the discharge of a pollutant onto the ground near a surface water is subject to a National Pollutant Discharge Elimination System (NPDES) Permit or State Waste Discharge Permit. Ecology believes the best guidance on this issue comes from the United States District Court Eastern District of Washington (*Washington Wilderness Coalition v. Hecla Mining*, 870 F. Supp 983, 990). The court held that since the goal of the Clean Water Act (CWA) is to protect the quality of surface waters, any pollutant, which enters such waters, whether directly or through groundwater, is subject to regulation by NPDES Permit. The court went on to hold, “It is not sufficient to allege groundwater pollution, and then to assert a general hydrological connection between all waters. Rather, pollutants must be traced from their source to surface waters, in order to come within the purview of the CWA.”

The decision on hydraulic continuity depends upon the:

- Pollutant (type and mobility in soils)
- Pollutant loading
- Soils at the site
- Hydrology of the site

Ecology has determined that it should issue a State Waste Discharge Permit and not an NPDES Permit for this facility. Although surrounded on three sides by Edison Slough, the very fine nature of the soils exchange of surface water and groundwater is extremely slow. This allows for extended residence time in the groundwater for natural biological activities to degrade potential surface water contaminants. This long residence time, combined with the fact that the soils are high in organic matter means denitrification will likely occur.

C. Wastewater characterization

Terramar Brewery reported the concentration of pollutants in the discharge for similar operations in the permit application. The following tabulated data also includes Ecology results for a similar facility. The tabulated data represents the quality of the wastewater likely to be discharged. The wastewater prior to land application is characterized as follows:

Table 2. Wastewater Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD ₅)	mg/L ^a	^b	3,000	9,000
Total Suspended Solids (TSS)	mg/L	^b	700	1,000
BOD ₅ ^c	mg/L	38	8,666	21,900
Flow ^c	gpd ^d	457	1,356	3,800
TSS ^c	mg/L	38	937.66	10,600
^a	mg/L = milligrams per liter.			
^b	Typical for industry.			
^c	Data from another brewery operation.			
^d	gpd = gallons per day.			

Parameter	Units	# of Samples	Minimum Value	Maximum Value
pH ^a	SU ^b	456 ^c	3.78	13.48
pH ^a	SU ^b	355 ^d	5.53	8.7
^a	Data from another brewery operation.			
^b	SU = standard units.			
^c	Results from single sample values during the entire period of record (04/01/2014 to 09/15/2015), including start-up and system adjustments.			
^d	Results from single sample values from 08/01/2014 to 09/15/2015 after system stabilization.			

D. State environmental policy act (SEPA) compliance

To meet the intent of SEPA, new discharges must undergo SEPA review during the permitting process. The facility filed a SEPA checklist with Skagit County in June 2018, and the Skagit County issued a mitigated determination of non-significance for the project on Insert date.

III. Proposed Permit Limits

State regulations require that Ecology base limits in a State Waste Discharge Permit on the:

- Technology and treatment methods available to treat specific pollutants (technology-based). Dischargers must treat wastewater using all known, available, reasonable methods of prevention, control, and treatment (AKART). Ecology has developed guidance describing technology-based (AKART) criteria for industrial/commercial systems that discharge to ground; (Ecology, 1993; 2004).
- Operations and best management practices necessary to meet applicable water quality standards to preserve or protect existing and future beneficial uses of the groundwater.
- Ground water quality standards (Ecology, 1996).
- Applicable requirements of other local, state and federal laws.

Ecology applies the most stringent of technology and water quality-based limits to each parameter of concern and further describes the proposed limits below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, monitoring, and irrigation/crop management). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, and are not listed in regulation.

Ecology does not usually develop permit limits for pollutants not reported in the permit application but may be present in the discharge. The permit does not authorize the discharge of the non-reported pollutants. During the five-year permit term, the facility’s effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology if significant changes occur in any constituent. Until Ecology modifies the permit to reflect additional discharges of pollutants, a permitted facility could be violating its permit.

A. Design criteria

Under WAC 173-216-110 (4), flows and waste loadings must not exceed approved design criteria. Ecology reviewed design criteria for this facility’s treatment and the spray field in the engineering report/facility plan/plans and specifications dated September 27, 2018, and prepared by Brewery Wastewater Design. The table below includes design criteria from the referenced report.

Table 3. Design Criteria for the Spray Fields

Parameter	Design Quantity
Monthly Average Flow (Maximum Month)	42,630 gal/month
Instantaneous Peak Flow	9.8 gpm
Total Annual Flow	511,560 gal/year
BOD ₅ Loading to the Spray fields	35.04 lb/day
TSS Loading to the Spray fields	1.17 lb/day
Total Nitrogen Loading to the Spray fields	0.76 lb/day
Acreage	2.5 acres

B. Technology-based effluent limits

Waste discharge permits issued by Ecology specify conditions requiring the facility to use AKART before discharging to waters of the state (RCW 90.48).

Ecology determined that the facility meets the minimum requirements demonstrating compliance with the AKART standard if the Terramar Brewery operates the treatment and disposal system as described in the approved engineering report and any subsequent Ecology approved reports.

Ecology also evaluated the report for water quality-based requirements which is described in the next section of the fact sheet.

Wastewater treatment (prior to land treatment) requirements

The only limit for wastewater before land treatment is adjustment of pH to between 6.0 and 9.0.

Land treatment requirements

Terramar Brewery must meet the following permit limits to satisfy the requirement for AKART:

- Apply of wastewater via spray irrigation must not exceed agronomic rates (as defined in Ecology’s groundwater implementation guidance) for total nitrogen and water. Wastewater application rates for other wastewater constituents must protect the background groundwater quality.
- Apply total nitrogen and water to the spray fields as determined by an Ecology approved and current irrigation and crop plan.
- Operate the system to protect the existing and future beneficial uses of the groundwater and not cause a violation of the groundwater standards.

Table 4. Technology-Based Effluent Limits

Effluent Limits		
Parameter	Average Monthly	Maximum Daily
Flow	395 gpd	1,421 gpd
Parameter	Average Monthly	Maximum Application Frequency
BOD ₅	75 lbs/day	4 days per week
Application Rate	5,650 gal/ac/day	4 days per week

C. Groundwater quality-based effluent limits

In order to protect existing water quality and preserve the designated beneficial uses of Washington's groundwater including the protection of human health, WAC 173-200-100 requires Ecology to condition discharge permits in such a manner as to authorize only activities that will not cause violations of the groundwater quality standards. The goal of the groundwater quality standards is to maintain the highest quality of the State’s groundwater and to protect existing and future beneficial uses of the groundwater through the reduction or elimination of the discharge of contaminants to groundwater [WAC 173-200-010(4)]. Ecology achieves this goal by:

- Applying all known available and reasonable methods of prevention, control and treatment (AKART) to any discharge.
- Applying the antidegradation policy of the groundwater standards.
- Establishing numeric and narrative criteria for the protection of human health and the environment in the groundwater quality standards.

Ecology approved the engineering report as noted above in the technology-based limits section. In addition, Ecology evaluated the report to ensure compliance with groundwater standards using the:

- *Guidance on Land Treatment of Nutrients in Wastewater, with Emphasis on Nitrogen*, Ecology, November 2004
<https://fortress.wa.gov/ecy/publications/documents/0410081.pdf>

Antidegradation policy

The state of Washington's ground water quality standards (GWQS) require preservation of existing and future beneficial uses of groundwater through the antidegradation policy, which includes the two concepts of antidegradation and non-degradation. Antidegradation is not the same as non-degradation (see below).

Antidegradation

Antidegradation applies to calculation of permit limits in groundwater when background (see below) contaminant concentrations are less than criteria in the GWQS. Ecology has discretion to allow the concentrations of contaminants at the point of compliance to exceed background concentrations but not exceed criteria in the GWQS. Ecology grants discretion through an approved AKART engineering analysis of treatment alternatives. If the preferred treatment alternative predicts that discharges to groundwater will result in contaminant concentrations that fall between background concentrations and the criteria, then the preferred treatment alternative should protect beneficial uses and meet the antidegradation policy. In this case, the predicted concentrations become the permit limits. If the preferred alternative will meet background contaminant concentrations, background concentrations become the permit limits. Permit limits must protect groundwater quality by preventing degradation beyond the GWQS criteria. If discharges will result in exceedance of the criteria, facilities must apply additional treatment before Ecology can permit the discharge.

Non-degradation

Non-degradation applies to permit limits in groundwater when background contaminant concentrations exceed criteria in the GWQS. Non-degradation means that discharges to groundwater must not further degrade existing water quality. In this case, Ecology considers the background concentrations as the water quality criteria and imposes the criteria as permit limits. To meet the antidegradation policy, the facility must prepare an AKART engineering analysis that demonstrates that discharges to groundwater will not result in increasing background concentrations. Ecology must review and approve the AKART engineering analysis.

You can obtain more information on antidegradation and non-degradation by referring to the Implementation Guidance for the Ground Water Quality Standards (Implementation Guidance), Ecology Publication #96-02 (available at <https://fortress.wa.gov/ecy/publications/documents/9602.pdf>)

Background water quality

Background water quality is determined by a statistical calculation of contaminant concentrations without the impacts of the proposed activity. The calculation requires an adequate amount of groundwater quality data and determining the mean and standard deviation of the data, as described in the Implementation Guidance. Following the procedure in the Implementation Guidance, Ecology then defines background water quality for most contaminants as the 95 percent upper tolerance limit. This means that Ecology is 95 percent confident that 95 percent of future measurements will be less than the upper tolerance limit. There are a few exceptions to the use of the upper tolerance limit. For pH, Ecology will calculate both an upper and a lower tolerance limit resulting in an upper and lower bound to the background water quality. If dissolved oxygen is of interest, Ecology will calculate a lower tolerance limit without an upper tolerance limit.

Applicable groundwater criteria as defined in chapter 173-200 WAC and in RCW 90.48.520 for this discharge include those in the following table:

Ecology has reviewed existing records for the facility's proposed land treatment site and is unable to determine background groundwater quality. The proposed permit includes a compliance schedule to establish the up gradient (background) quality of the groundwater. Until Ecology establishes background water quality, the facility must operate within the approved design parameters and comply with all conditions in the permit.

At this time no groundwater limits or early warning values are established for this facility.

IV. Monitoring Requirements

Ecology requires monitoring, recording, and reporting (WAC 173-216-110) to verify that the treatment process functions correctly, the discharge meets groundwater criteria and that the discharge complies with the permit's effluent limits.

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit. The permit describes when facilities may use alternative methods. It also describes what to do in certain situations when the laboratory encounters matrix effects. When a facility uses an alternative method as allowed by the permit, it must report the test method, detection level (DL), and quantitation level (QL) on the discharge monitoring report or in the required report.

A. Lab accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, Accreditation of Environmental Laboratories, to prepare all monitoring data (with the exception of certain parameters including some that are better measured in situ or immediately after sampling).

B. Irrigated wastewater monitoring

Ecology details the proposed monitoring schedule under Special Condition S2.A. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

C. Vadose zone monitoring

Because of the unique location of this facility Ecology is requiring vadose zone monitoring during at least the first permit cycle. Vadose zone monitoring will concentrate on the movement of moisture through the unsaturated (vadose) zone to the groundwater table. Ecology details the proposed monitoring schedule under Special Condition S2.B.

D. Groundwater monitoring

Ecology requires groundwater monitoring at the site in accordance with the Ground Water Quality Standards, chapter 173-200 WAC. Ecology has determined that this discharge has a potential to pollute the groundwater. Therefore, the Facility must evaluate the potential

impacts on groundwater quality. Ecology considers monitoring of the groundwater at the site boundaries and within the site an integral component of such an evaluation. Ecology details the proposed monitoring schedule under Special Condition S2.C.

E. Soil monitoring

Ecology details the proposed monitoring schedule under Special Condition S2.D. The facility and Ecology use the soil monitoring data to monitor and evaluate wastewater application rates and to determine if salts and nutrients are flushing through the root zone and leaching to the groundwater. The presence and concentration of certain wastewater related parameters in the soils (e.g., nitrogen and salts) can indicate over application of wastewater. The facility must follow the analytical methods provided in Soil, Plant and Water Reference Methods for the Western Region (2003).

F. Crop monitoring

Ecology details the proposed monitoring schedule under Special Condition S2.E. The facility and Ecology use the crop monitoring data to develop the nutrient and salt balances that are necessary to demonstrate compliance with the agronomic rate limit in Special Condition S1.

V. Other Permit Conditions

A. Reporting and record keeping

Ecology based Special Condition S3 on its authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-216-110).

B. Operations and maintenance

Ecology requires dischargers to take all reasonable steps to properly operate and maintain their wastewater treatment system in accordance with state regulations (WAC 173-240-080 and WAC 173-216-110). The facility must prepare and submit of an operation and maintenance (O&M) manual for the wastewater facility.

Implementation of the procedures in the operation and maintenance manual ensures the facility's compliance with the terms and limits in the permit and ensures the facility provides AKART to the waste stream.

C. Non-routine and unanticipated wastewater

Occasionally, this facility may generate wastewater that was not characterized in the permit application because it is not a routine discharge and was not anticipated at the time of application. These wastes typically consist of waters used to pressure-test storage tanks or fire water systems or of leaks from drinking water systems.

The permit authorizes the discharge of non-routine and unanticipated wastewater under certain conditions. The facility must characterize these waste waters for pollutants and examine the opportunities for reuse. Depending on the nature and extent of pollutants in this wastewater and on any opportunities for reuse, Ecology may:

- Authorize the facility to discharge the wastewater.
- Require the facility to treat the wastewater.
- Require the facility to reuse the wastewater.

D. Groundwater evaluation (groundwater monitoring network study)

In accordance with WAC 173-200-080, the proposed permit requires the facility to prepare and submit an evaluation for the establishment of a groundwater monitoring network for the land treatment site for Ecology review and approval. The groundwater monitoring network evaluation shall determine site-specific hydrogeologic conditions, optimum well siting, quality control protocols, a sampling plan, and sampling protocols. To prepare the plan, the facility must use "*Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems*," (Ecology 1993) and "*Implementation Guidance for the Ground Water Quality Standards*" (Ecology, 2005).

E. Industrial stormwater discharge

In accordance with 40 CFR 122.26, the permit includes a requirement for the facility to apply for Ecology's Industrial Stormwater General Permit for authorization to discharge stormwater that is exposed to industrial activities.

Most of the storm water generated at this site is discharged to ground and infiltrates. However, there is a potential for storm water from pollution generating surfaces (galvanized or unpainted metal roofs) to enter surface water via the surface water ditch. The permittee may manage storm water by preventing exposure of sources of pollution, infiltrating storm water or a combination of both. Storm water has potential to enter Edison Slough if it reaches the drainage ditch along the inside of the levy. The ditch discharges to Edison Slough through a monitored tide gate.

F. Best management practices – land treatment site

Best management practices (BMPs) are the actions identified to manage, prevent contamination of storm water/groundwater. BMPs include schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. The list below describes best management practices applicable for land treatment sites.

The Permittee must:

1. Not allow spray irrigation practices to result in runoff of wastewater to any surface waters of the state or to any land not owned by or under its control.
2. Use recognized good practices, and all available and reasonable procedures to control odors from the land application system.
3. Implement measures to reduce odors to a reasonable minimum when notified by Ecology.

4. Not apply wastewater to the irrigation lands in quantities that would:
 - a. Significantly reduce or destroy the long-term infiltration rate of the soil.
 - b. Cause long-term anaerobic conditions in the soil.
 - c. Cause ponding of wastewater and produce objectionable odors or support insects or vectors.
 - d. Cause leaching losses of constituents of concern beyond the treatment zone or in excess of the approved design. Constituents of concern are constituents in the wastewater, partial decomposition products, or soil constituents that would alter groundwater quality in amounts that would affect current and future beneficial uses.
5. Maintain all irrigation agreements for lands not owned for the duration of the permit cycle. Any reduction in irrigation lands by termination of any irrigation agreements may result in permit modification or revocation.
6. Immediately inform Ecology in writing of any proposed changes to existing irrigation agreements.
7. Meet the leaching requirement using precipitation and/or fresh water whenever leaching is required to control soil salinity.
8. Not load BOD5 to the fields in excess of 100 lbs/acre/day.
9. Not apply wastewater in excess of one inch per week (including precipitation) during the months of October to April.

G. Irrigation and crop management plans

Ecology requires the irrigation and crop management plan to support the engineering report(s) and operations and maintenance manual. This plan must include a consideration of wastewater application at agronomic rates as required by Special Condition S1 and should describe and evaluate various irrigation controls.

Plans must comply with the requirements for an irrigation and crop management plan given in Ecology's guidance, Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems (1993).

H. General conditions

Ecology bases the standardized general conditions on state law and regulations. They are included in all individual industrial state waste discharge permits issued by Ecology.

VI. Permit Issuance Procedures

A. Permit modifications

Ecology may modify this permit to impose numerical limits, if necessary, to comply with water quality standards for groundwater, based on new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state regulations.

B. Proposed permit issuance

This proposed permit meets all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of 5 years.

VII. References for Text and Appendices

Gavlak, R., D. Horneck, R.O. Miller, and J. Kotuby-Amacher.

3rd edition 2005. Soil, Plant and Water Reference Methods for the Western Region
<https://www.naptprogram.org/files/napt/western-states-method-manual-2005.pdf>

Washington State Department of Ecology.

1993. Guidelines for Preparation of Engineering Reports for Industrial Wastewater Land Application Systems, Ecology Publication Number 93-36. 20 pp.
<https://fortress.wa.gov/ecy/publications/documents/9336.pdf>

Laws and Regulations (<https://ecology.wa.gov/Regulations-Permits>)

Permit and Wastewater Related Information (<https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-quality-permits>)

Revised October 2005. *Implementation Guidance for the Ground Water Quality Standards*, Ecology Publication Number 96-02.
<https://fortress.wa.gov/ecy/publications/documents/9602.html>

December 2011. *Permit Writer's Manual*, Publication Number 92-109
(<https://fortress.wa.gov/ecy/publications/documents/92109.pdf>)

February 2007. *Focus Sheet on Solid Waste Control Plan, Developing a Solid Waste Control Plan for Industrial Wastewater Discharge Permittees*, Publication Number 07-10-024.
<https://fortress.wa.gov/ecy/publications/documents/0710024.pdf>

November 2004. *Guidance on Land Treatment of Nutrients in Wastewater, with Emphasis on Nitrogen*, Ecology Publication #04-10-081;
<https://fortress.wa.gov/ecy/publications/documents/0410081.pdf>

Appendix A--Public Involvement Information

Ecology proposes to issue a permit to Terramar Brewery. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology placed a Public Notice of Draft on August 28, 2019, in the *Skagit Valley Herald* to inform the public and to invite comment on the proposed draft State Waste Discharge permit and fact sheet.

The notice:

- Told where copies of the draft Permit and Fact Sheet were available for public evaluation (a local public library, the closest Regional or Field Office, posted on our website).
- Offered to provide the documents in an alternate format to accommodate special needs.
- Urged people to submit their comments, in writing, before the end of the Comment Period.
- Told how to request a public hearing of comments about the proposed state waste discharge permit.
- Explained the next step(s) in the permitting process.

Ecology has published a document entitled Frequently Asked Questions about Effective Public Commenting, which is available on our website at

<https://fortress.wa.gov/ecy/publications/documents/0307023.pdf>.

You may obtain further information from Ecology by telephone (425) 649-7110, email (cmar461@ecy.wa.gov), or by writing to the address listed below.

Water Quality Permit Coordinator
Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

The primary author of this permit and fact sheet is Christopher Martin.

Appendix B--Your Right to Appeal

You have a right to appeal this permit to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of the final permit. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2) (see glossary).

To appeal you must do the following within 30 days of the date of receipt of this permit:

- File your appeal and a copy of this permit with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this permit on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	Department of Ecology Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel RD SW STE 301 Tumwater, WA 98501	Pollution Control Hearings Board PO Box 40903 Olympia, WA 98504-0903

Appendix C--Glossary

AKART -- The acronym for “all known, available, and reasonable methods of prevention, control and treatment.” AKART is a technology-based approach to limiting pollutants from wastewater discharges, which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Ambient water quality -- The existing environmental condition of the water in a receiving water body.

Average monthly discharge limit -- The average of the measured values obtained over a calendar months' time.

Background water quality -- The concentrations of chemical, physical, biological or radiological constituents or other characteristics in or of groundwater at a particular point in time up gradient of an activity that has not been affected by that activity [WAC 173-200-020(3)]. Background water quality for any parameter is statistically defined as the 95% upper tolerance interval with a 95% confidence based on at least eight hydraulically up gradient water quality samples. The eight samples are collected over a period of at least one year, with no more than one sample collected during any month in a single calendar year.

Best management practices (BMPs) -- Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD₅ -- Determining the five-day Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD₅ is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass -- The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine -- A chemical used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Clean water act (CWA) -- The federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance inspection-without sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance inspection-with sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for

municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite sample -- A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction activity -- Clearing, grading, excavation, and any other activity, which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous monitoring -- Uninterrupted, unless otherwise noted in the permit.

Date of receipt -- This is defined in RCW 43.21B.001(2) as five business days after the date of mailing; or the date of actual receipt, when the actual receipt date can be proven by a preponderance of the evidence. The recipient's sworn affidavit or declaration indicating the date of receipt, which is unchallenged by the agency, constitutes sufficient evidence of actual receipt. The date of actual receipt, however, may not exceed forty-five days from the date of mailing.

Detection limit -- The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Dilution factor (DF) -- A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Distribution uniformity -- The uniformity of infiltration (or application in the case of sprinkle or trickle irrigation) throughout the field expressed as a percent relating to the average depth infiltrated in the lowest one-quarter of the area to the average depth of water infiltrated.

Early warning value -- The concentration of a pollutant set in accordance with WAC 173-200-070 that is a percentage of an enforcement limit. It may be established in the effluent, groundwater, surface water, the vadose zone or within the treatment process. This value acts as a trigger to detect and respond to increasing contaminant concentrations prior to the degradation of a beneficial use.

Enforcement limit -- The concentration assigned to a contaminant in the groundwater at the point of compliance for the purpose of regulation, [WAC 173-200-020(11)]. This limit assures that a groundwater criterion will not be exceeded and that background water quality will be protected.

Engineering report -- A document that thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Grab sample -- A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Groundwater -- Water in a saturated zone or stratum beneath the surface of land or below a surface water body.

Industrial wastewater -- Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and leachate from solid waste facilities.

Maximum daily discharge limit -- The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is the maximum discharge of a pollutant measured during a calendar day.

Method detection level (MDL) -- See Detection Limit.

National pollutant discharge elimination system (NPDES) -- The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

pH -- The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral and large variations above or below this value are considered harmful to most aquatic life.

Point of compliance -- The location in the groundwater where the enforcement limit must not be exceeded and a facility must comply with the Ground Water Quality Standards. Ecology determines this limit on a site-specific basis. Ecology locates the point of compliance in the groundwater as near and directly down gradient from the pollutant source as technically, hydrogeologically, and geographically feasible, unless it approves an alternative point of compliance.

Quantitation level (QL) -- Also known as Minimum Level of Quantitation (ML) – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to $(1, 2, \text{ or } 5) \times 10^n$, where n is an integer (64 FR 30417).

ALSO GIVEN AS:

The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency, December 2007).

Reasonable potential -- A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

Responsible corporate officer -- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or

more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Sample Maximum -- No sample may exceed this value.

Soil scientist -- An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting Scientists or who has the credentials for membership. Minimum requirements for eligibility are: possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and have 5, 3, or 1 year(s), respectively, of professional experience working in the area of agronomy, crops, or soils.

Solid waste -- All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

State waters -- Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater -- That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based effluent limit -- A permit limit based on the ability of a treatment method to reduce the pollutant.

Total coliform bacteria -- A microbiological test, which detects and enumerates the total coliform group of bacteria in water samples.

Total dissolved solids -- That portion of total solids in water or wastewater that passes through a specific filter.

Total suspended solids (TSS) -- Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset -- An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water quality-based effluent limit -- A limit imposed on the concentration of an effluent parameter to prevent the concentration of that parameter from exceeding its water quality criterion after discharge into receiving waters.

Appendix D--Technical Calculations

Proposed facility layout (11 x 17)

Process design flow (11 x 17)

Land distribution plot (8.5 x 11)

Critical areas designations (8.5 x 11)

Soils map and description (8.5 x 11)

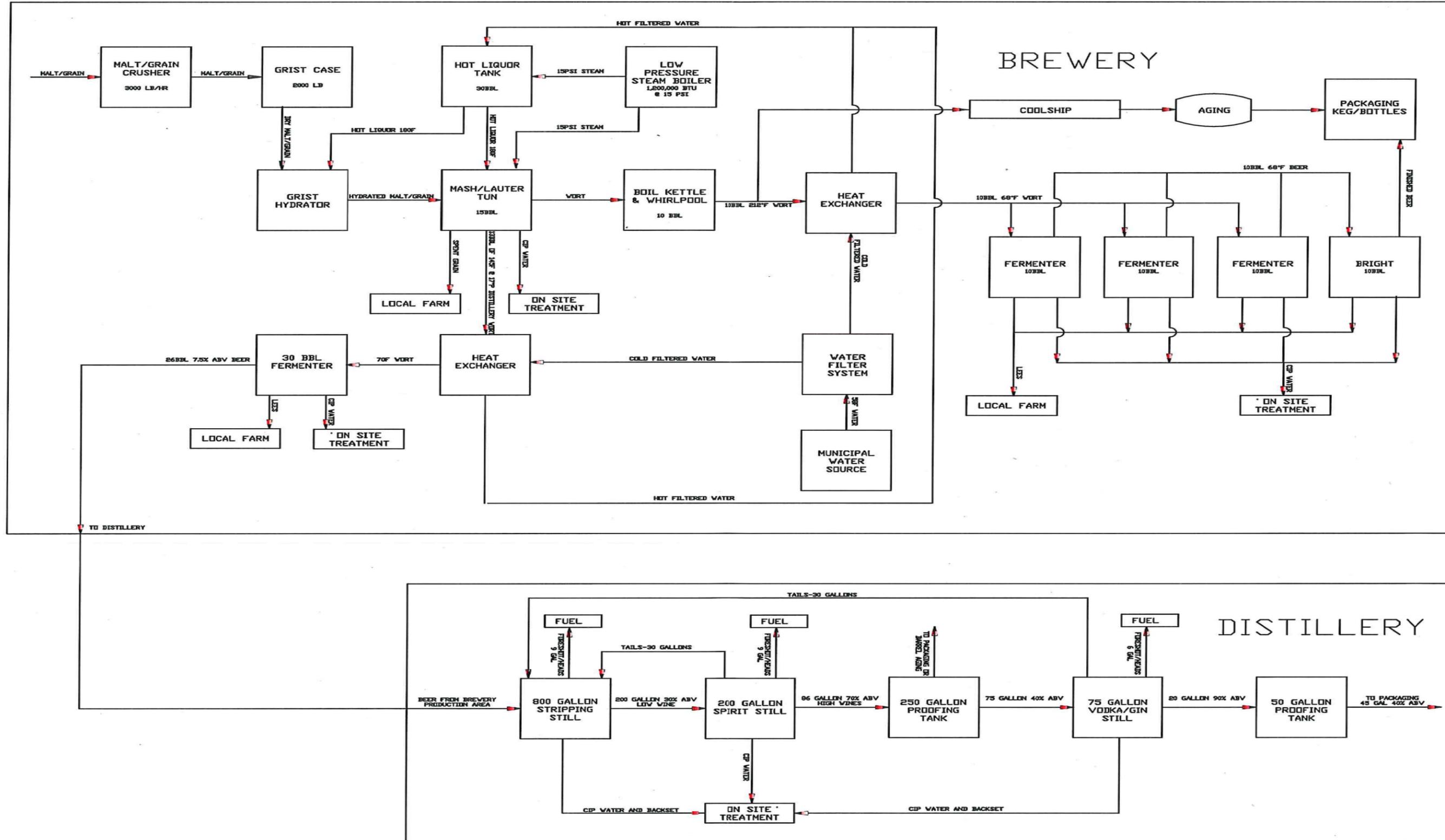


Figure 4 D-2. Process Flow Diagram

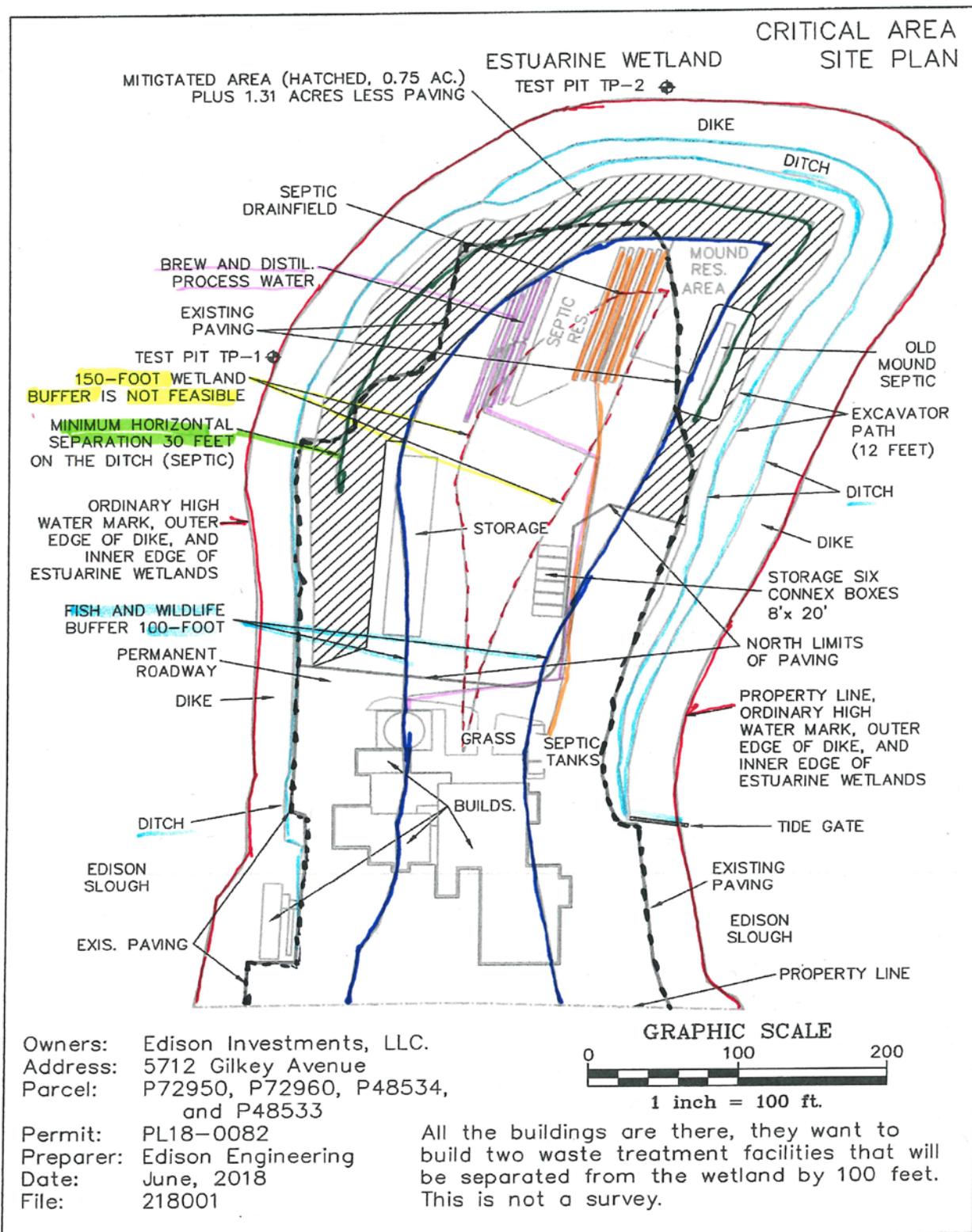


Figure 5 D-3. Critical Area Boundaries

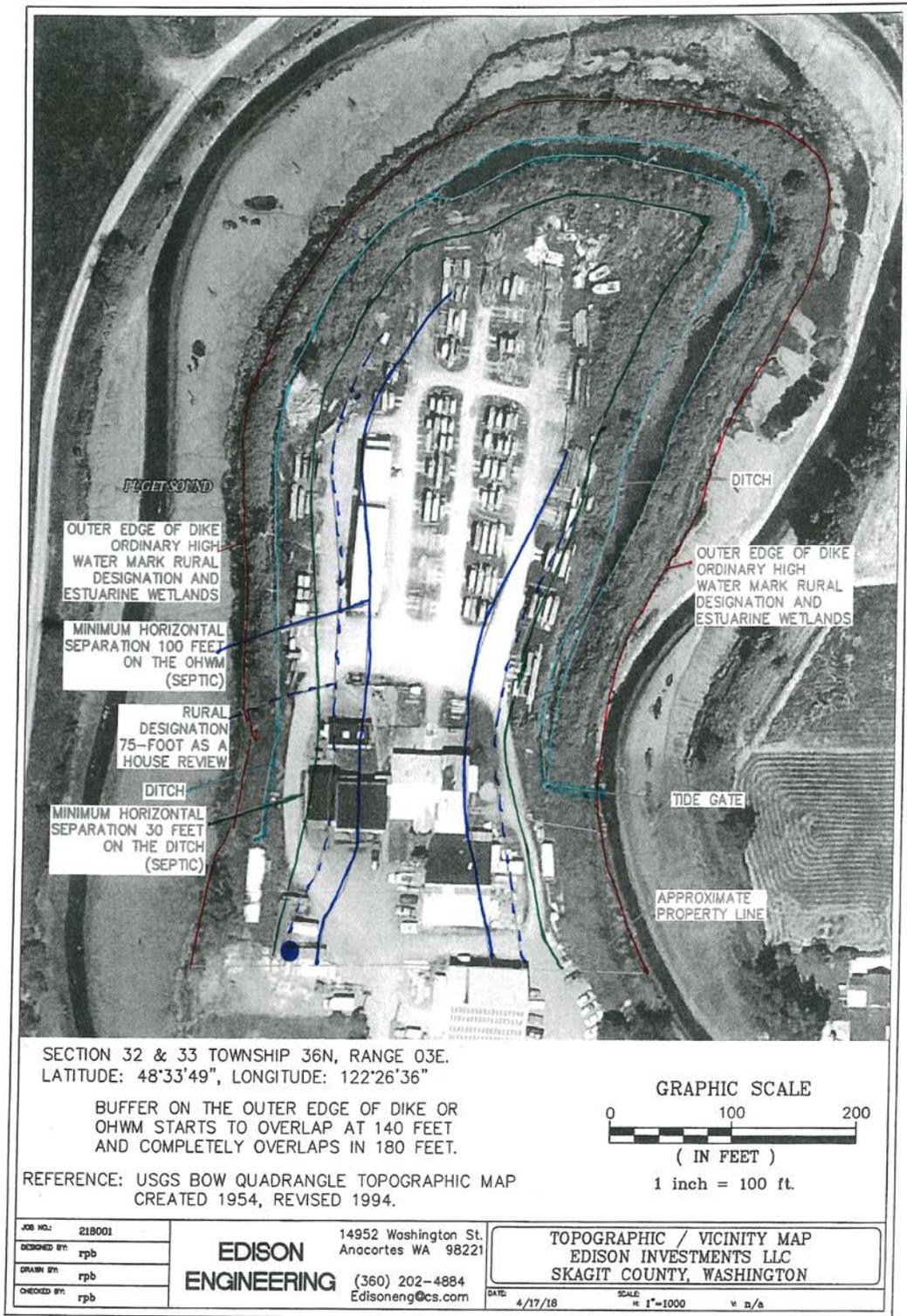


Figure 6 D-4. Critical Area Setbacks With Ortho-Photo Underlay

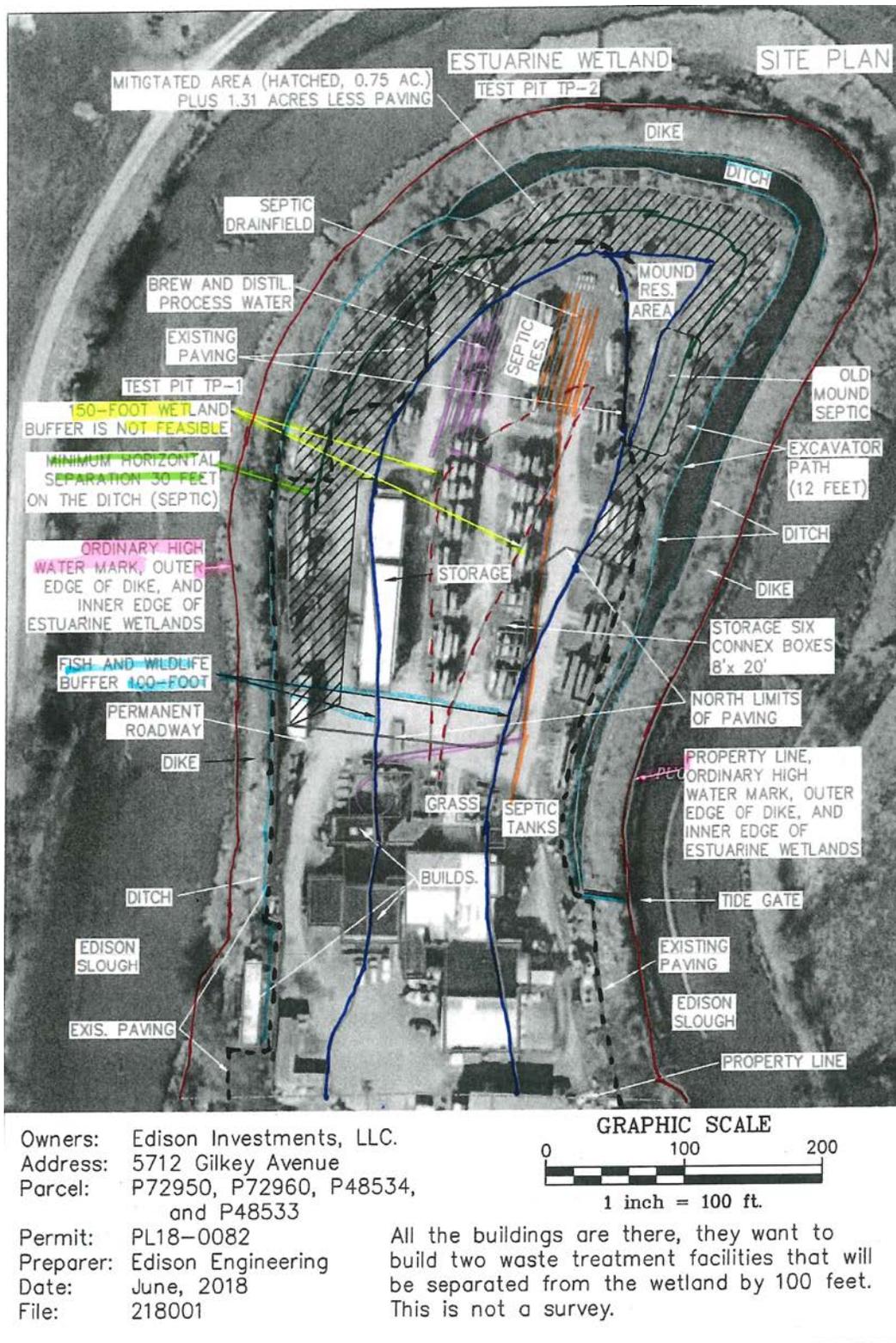


Figure 7 D-5. Ortho-Photo Showing Critical Area Boundaries

Appendix E--Response to Comments

Ecology published notification of the availability of the draft permit and fact sheet for Terramar Brewery in the *Skagit Valley Herald* on August 28, 2019. The 30-day public review and comment period ended September 28, 2019.

No comments on either the draft permit or fact sheet were received by Ecology.