2023

Septic Designer In Training

Gabriel McGuire
Western Washington University

I. STUDENT/INTERN INFORMATION

Name: Gabriel McGuire	W#: W01365838
Major: Environmental Science	Concentration: N/A
Internship Title: Septic Designer in Training	
Period of Internship: From September 20th, 2022 to March 3rd, 2023 (5 credits total)	
Avg. Hours per Week: 9	Total Hours Worked: 163.25

II. HOST INSTITUTION INFORMATION

Institution Name: Mitchell Septic Inc.
Institution Address: 19712 E Conway Hill Lane Mount Vernon, WA 98274
Institution Mission: Mitchell Septic Inc. designs, evaluates, and consults within the septic-related field. They stand to provide a product that is in the client's best interest and maintains the health of the environment (Mitchell and Mitchell, 2003).
Supervisor Name and Title: David Mitchell, Company Owner and Lead Designer
Supervisor Contact Information: David@mitchellseptic.com 3604213600

III. DESCRIPTION

Provide a brief description of the project or program on which you worked, the objectives of that project or program, and your role as an intern within that project or program:

As a septic designer trainee, I performed many of the tasks a certified septic designer would do. The objectives of this role consisted of two main components: fieldwork, and design work. The fieldwork included collecting data to design a septic system or evaluate the site given the parameters of the project. Soil quality, critical areas, setbacks from existing utilities, and available space were all important parameters to consider. The design element focused on drafting a septic system on computer software. Each design follows consistent rules and regulations put out by the Washington State Department of Health and each subsequent local (e.g., county) health jurisdictions. A design consisted of a system layout (i.e., tanks, transmission lines, and drain field) that included important features of the site. In addition, the design gave specifications of each component to be used in the design and classification of the vertical profile of soils throughout the site. As a designer, it was my job to follow these regulations to create a system that aids in protecting the integrity of the environment while also considering the client's best interest.

IV. DUTIES AND RESPONSIBILITIES

Provide a list of your specific duties and responsibilities as an intern:

- Arranged jobs by exchanging emails or phone calls with clients and gathering background information about sites
- Discussed with clients the area of work that needed to be done. This included a design for a new system or a repair, soil logging, design for drainage, or general consulting.
- Mapped out the parcel or property of the clients. This was done with a total station, compass, map, tape measure, and other additional geospatial information related to the site.
- Tested soils collecting data on color, type, structure, mottling, root depth, and water level.
- Designed septic systems suitable for the site established by soil suitability, the client’s interest, county regulations, and low environmental impact.
- Drafted designs using a CAD software
- Submitted septic designs or site evaluations to the applicable county in those counties’ preferred format.

V. LEARNING OBJECTIVES

Describe what you learned from your internship and how this experience contributed to your educational goals:

This internship provided a hands-on experience that added to my education in environmental science and helped me to pursue my goal of bettering the environment. This internship brought into fruition the aspects of being able to live and interact in a place where our human waste goes. I learned about the many soil and microbial processes that take place to treat septage in order for it to safely be released into our environment. This included taking a class on soil parameters and talking about grain size and textural analysis, as well as the organisms that help treat the waste. I learned about the legal and regulatory standpoints of the trade and how specific rules are set in place that support the health of the environment, including the people that live in it. I was thankful that this internship opportunity allowed me to be a part of a process where you take toxic waste and through mechanical and biological processes produce something suitable to be released into the environment. I was able to see something through from start to finish and obtain positive results from my work, which I feel is a hard thing to do within any field.

VI. LITERATURE CITED

Provide reference information for all sources cited in your report:

Mitchell, D., and D. Mitchell. 2003. *Septic Design & Consultation*. Mitchell Septic Inc. http://mitchellseptic.com/mitchell-septic. Accessed March 1, 2023.

APPENDIX I. SUPERVISOR LETTER

Attach a signed letter from your supervisor, on the host institution's letterhead, stating that you have completed the internship according to the organization's expectations and confirming the dates and number of hours of your internship work.

Mitchell Septic, Inc.

Design
Inspection
Maintenance
Soil Survey (Perc)

February 24, 2023

WWU College of the Environment
516 High Street, MS 9079
Bellingham, WA 98225

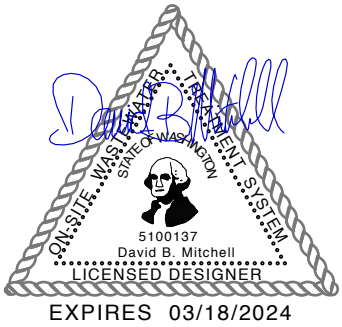
RE: Supervisor's letter supporting Internship Report – Septic Designer In Training Gabriel McGuire
WWU Environmental Science Fall/Winter 22/23

To whom it may concern:

Gabriel McGuire has completed the environmental science internship fall and winter quarter 22/23 as described in the internship report. I confirm that Gabriel worked 163.25 hours for 18 weeks from September 21st to March 17th.

As stated in the report, his activities included Site Evaluations and design Design related to on-site septic systems. Technical field skills developed included textural analysis of soils, data acquisition and site mapping using a total station and overall site evaluation for the purposes of wastewater treatment system permitting and construction. Gabriel completed a number of design projects integrating field data he generated with State and County On-site Septic System (OSS) regulations to formulate OSS designs, At least three projects were completed in their entirety from site review to permit approval. Gabriel also worked extensively reviewing and evaluating existing OSS in field operation.

Sincerely,
Mitchell Septic, Inc.



David B. Mitchell
Professional On-Site Wastewater
Treatment System Designer

19712 E. Conway Hill Lane
Mount Vernon, WA 98274

Voice: 360.421.3600
Fax: 360.445.4311
Email: david@mitchellseptic.com

APPENDIX II. SUPPORTING DOCUMENTS

Attach copies of any reports, presentations or other deliverables that you produced during your internship, if applicable.

Septic Permit Application

Planning & Development Services · 1800 Continental Place · Mount Vernon WA 98273
voice 360-416-1320 · inspections 360-416-1330 · www.skagitcounty.net/planning

Permit #:

Septic permits are issued by Skagit County Public Health. Submit your application for processing at the Planning & Development Services permit counter, or by mail with the appropriate fee and attachments.

Project & Property Information

Tell us about your project and its proposed location.

1 OF 16

Site Address	2135 Nulle Road	**City**	Skagit County	**Zip**	na
Parcel No(s)	P47501				

Attachments

- ■ Design (if required)
- ■ Soil Evaluation (if required)

Prerequisites Unless one of the boxes below are checked, items 1-3 are required:

☐ Site evaluation with no design ☐ Repair with no expansion of footprint ☐ Permit inside city/town limits

PDS-use only ↓ Planning & Development Services staff are available to help you complete and explain these requirements.

1. **Lot of Record Certification** is required for all development.[1] Check one of the boxes that applies below. If you do not have lot certification, apply for lot certification with Planning & Development Services.
   - ■ Lot certification is recorded under Auditor's File Number 200701260147 & 200. Nothing further required.
   - ☐ The lot has an existing dwelling unit that was constructed prior to July 1, 1990, according to Assessor records, but lot certification was not recorded. Lot certification file number is _____.
   - ☐ The lot was properly platted and approved by Skagit County on or after March 1, 1965, and has no restriction barring future development, but lot certification was not recorded. Lot certification file number is _____.
   - ☐ The lot has an approved but unrecorded lot certification. Lot certification number _____. **Recording fee is required.**
2. **Critical Areas Review** is required for septic permits. If you have not previously completed critical areas review for your parcel, apply at Planning & Development Services and attach your approval letter. Your application will be rejected if critical areas review is not complete for your location. Critical Area File number PL02-0339.
3. **Ag-NRL Siting Criteria.** Is this project in the Agricultural-Natural Resource Land zone?
   - ■ No. Nothing further required.
   - ☐ Yes. Please note:
     - Location of the septic system must comply with the siting criteria in SCC 14.16.400(6) and the Administrative Official Interpretation March 16, 2010.
     - On a parcel larger than 1 acre, you must demonstrate three years of income from your own commercial agricultural production on the parcel averaging at least $100 per acre per year for the last three years in order to construct a residence.

Fees

Site evaluation	■ Site evaluation ($285 for up to two evaluations at the same site) ☐ Additional evaluations at same site ($100 x ___ additional evaluations)		
Design review	■ New design ($500)	☐ New tank ($240)	☐ Repair ($300)
	☐ Redesign ($200)	☐ Renewal ($200)	☐ Table 9 Repair ($300)
Recording fees	☐ Lot certification ($104.50)	☐ OM&M for Proprietary Systems ($103.50)	
Total fees submitted	$785	Make check payable to Skagit County Planning & Development Services	

Permit Details

History

Any previous site evaluations or designs for this site? ☐ No ■ Yes, describe:

What year was work done? 2006

Name or project file number: SW06-0749

Site evaluation

■ Existing lot ☐ Proposed lot

Design type

☐ Aerobic/Drip	☐ Glendon	☐ Packed Bed Filter
☐ Aerobic/Mound	☐ Gravel Filter	☐ Sand Filter
☐ Aerobic/Pressure	☐ Gravity with Pump	☐ Sand Lined
☐ Conventional/Gravity	■ Mound	☐ Other, describe:
☐ Conventional/Pressure	☐ Oscar	

System use

NA

■ Residential →	# of bedrooms: 3	# gal/day/bedroom:	total daily flow: 360
☐ Non-residential →	# of occupants:	# gal/day/occupant:	total daily flow:

Proposed subdivision

■ No subdivision proposed

☐ Short subdivision (2-4 lots)

☐ Long subdivision (5 or more lots); lot #___ of ___ lots

Proposed subdivision name:

Lot size (acres):

Staff Use Only Below This Line

Inspections

Site evaluation	____/____	Design review	____/____
Soil/site preparation	____/____	Above/below ground devices	____/____
Open trenches	____/____	Pressure test	____/____
Self-inspection	____/____	Installed as designed	____/____
Final inspection	____/____		

[1] SCC 14.06.090(1)(b)

Contact Information & Signature Form

Planning & Development Services · 1800 Continental Place · Mount Vernon WA 98273
voice 360-416-1320 · inspections 360-416-1330 · www.skagitcounty.net/planning

Permit #:
Received by:

Attach this form to an application that requires it. An application will not be accepted without this form.

By signing this form, the undersigned certifies that the statements, answers, and information both on this form and the remainder of this permit application are true and correct to the best of his or her knowledge and belief.

Applicant/Contact

Name: Seth & Cecelia Carson | Mailing Address: P.O. Bopx 28434
City, State: Bellingham, WA | Zip: 98228 | Phone: 425-232-9006
Email: cecelia@realestatewa.biz

Property Owner

■ Same as applicant ☐ Multiple owners (attach additional page)

Name: | Mailing Address:
City, State: | Zip: | Phone:
Email:

Contractor/Designer/Installer

☐ None ☐ Same as applicant ☐ Same as property owner

Name: David Mitchell | Mailing Address: 19712 E Conway Hill Ln
City, State: Mount Vernon, WA | Zip: 98274 | Phone: (360) 421-3600
Email: mitchell@wavecable.com | License #: 5100137 | Expires: 3.18.2024

Financing[1]

☐ None ☐ Lender below is providing construction financing ☐ Firm below has issued payment bond

Name: | Mailing Address:
City, State: | Zip: | Phone:

Signature

☑ I am the owner of the subject property and I grant permission to field staff to enter the site to verify the presence or absence of critical areas and perform inspections of work proposed by this application; OR

☐ This is a fire suppression permit, mechanical/plumbing permit, or pre-development/pre-app meeting request; the property owner's authorization is not required.

Signature(s): [signature] Date: 10.3.22
Printed Name: Cecelia Carson
Title: OWNER
Company:

[1] Required by RCW 19.27.095(2)(d) for building permit applications.

Mitchell Septic, Inc.

David Mitchell
Licensed Designer
19712 E. Conway Hill Lane
Mount Vernon, WA 98274
(360) 421-3600
fax (360) 445-4311
david@mitchellseptic.com

CLIENT NAME/JOB # Carson / 216050

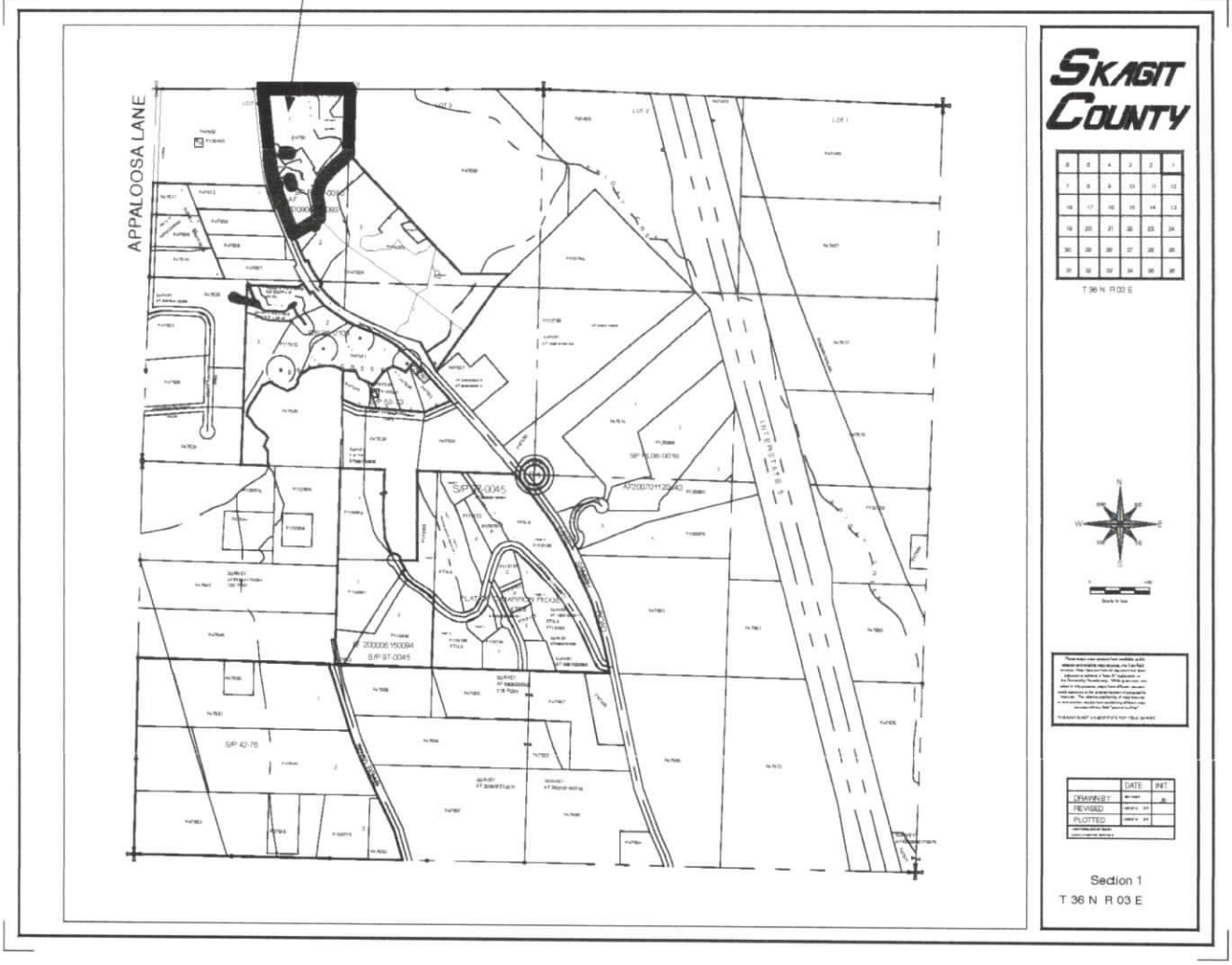
PROPERTY ID# P47501 / 360301-0-004-0000

DRAWN BY DBM DATE Sept. 28, 2022

SCALE NTS SHEET NO. 4 OF 16

Section Map

SUBJECT PROPERTY
63 Lake Samish



- Section map source: Skagit County GIS Department. Accuracy is not guaranteed.
- All bearings, dimensions and locations are approximate.
- Map is intended to show parcel in context of neighboring properties and to assist in site location.
- See attached sheets for additional details.

ONSITE WASTEWATER TREATMENT SYSTEM
STATE OF WASHINGTON
5100137
David B. Mitchell
LICENSED DESIGNER
EXPIRES 03/18/2024

Mitchell Septic, Inc.

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Licensed Designer
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Mount Vernon, WA 98274
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fax (360) 445-4311
david@mitchellseptic.com

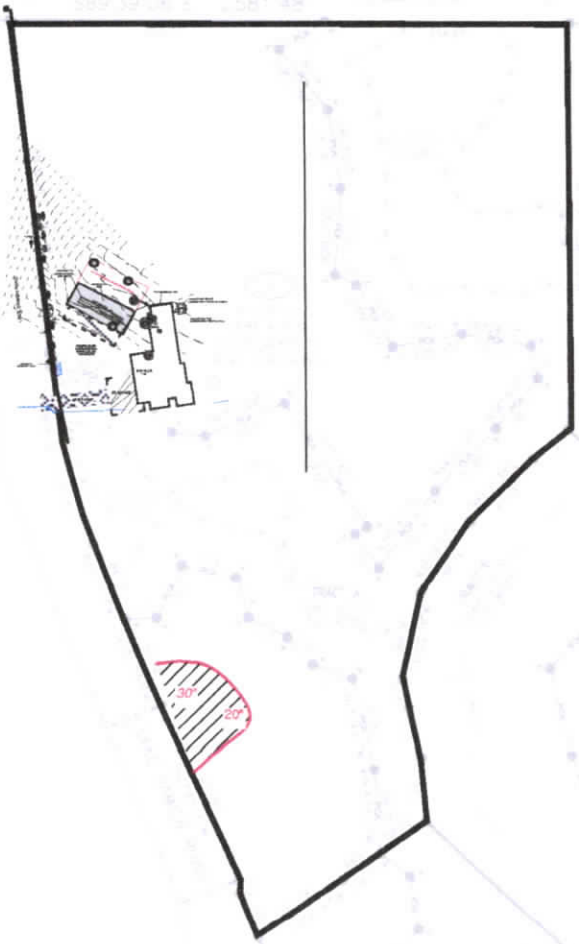
CLIENT NAME/JOB # *Perry / 217095*

PROPERTY ID# *P101352 / 340433-3-0040-0600*

DRAWN BY DBM DATE *April 28, 2017*

SCALE 1" = 200' SHEET NO. 5 OF 16

Site Overview



N

0' 100' 200'

SCALE 1" = 200'

EXPIRES 03/18/2024

THIS IS NOT A SURVEY.

- This document is NOT a survey and is not intended as such. Property corner, boundary, topography, and all other site features are derived from field measurements, client representation, and public documents. This drawing is intended ONLY for the evaluation, review, and/or approval of an on-site septic system pursuant to WAC246-272 and Local Health Jurisdiction regulation. This drawing should not be utilized for any other purpose.
- All bearings, dimensions, and locations are approximate.

Methods and Equipment:

- Field measurements performed using a Leica1103 RCA robotic total station and Allegro CX data collector with Carlson SurvCE data collection software

General Notes:

- Grading, clearing or other soils alteration/movement in the drain field area can destroy the sites ability to support an on-site septic system. Clearing in a drain field area shall be performed in consultation with a licensed designer or installer of record.
- Minimum County and Washington State code requirements shallow be met whether described in this document or not.
- Call the Washington Utilities Coordinating Council **BEFORE YOU DIG** at 1-800-424-5555. This service is free and requires 48 hour notice.
- Waste water entering the system is expected to have the consistency and strength typical of domestic households, (AKA" residential sewage") with septic tank effluent parameters not to exceed the following ranges: BOD5: 130-200 mg/L; CBOD5: 108-191 mg/L; TSS: 49-150 mg/L; Oil and Grease: 10-25 mg/L.

(1) = Soil log hole - see attached sheet for descriptions.

- IMPORTANT: REFER TO ATTACHED DESIGN COMMENTARY

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CLIENT NAME/JOB # Carson / 216050
PROPERTY ID# P47501 / 360301-0-004-0000
DRAWN BY DBM DATE Sept. 28, 2022
SCALE N/A SHEET NO. 6 OF 16

Soil Log Detail

EXAMINATION DATE: SEP 12TH, 2022
PREVIOUS WEEK PRECIPITATION: NONE
DOMINANT VEGETATION: AR, RS
EXPECTED WATER TABLE CONDITIONS: LOW

SOIL LOG 1

HORIZON DEPTH				COLOR, MODIFIER	TEXTURE	APP. RATE	TYPE
0	TO	4	INCHES	BRN	L	0.60	4
4	TO	15	INCHES	RD BRN	SL	0.60	4
15	TO	24	INCHES	GRY	SL	0.60	4
	24+		INCHES	GRY	SCL	0.20	N/A

MAX. ROOT DEPTH: 21 SYSTEM TYPE: PRESSURIZED
MIN. MOTTLING DEPTH: NONE
DEPTH TO STANDING WATER: NONE
UPPER HORIZONS EXHIBIT MODERATE TO STRONG GRANULAR STRUCTURE

SOIL LOG 2

0	TO	6	INCHES	LT BRN	L	0.60	4
6	TO	22	INCHES	V LT BRN	SL	0.60	4
	22+		INCHES	BRN GRY	SCL	N/A	N/A

MAX. ROOT DEPTH: 14 SYSTEM TYPE: PRESSURIZED
MIN. MOTTLING DEPTH: NONE
DEPTH TO STANDING WATER: NONE
UPPER HORIZONS EXHIBIT MODERATE TO STRONG GRANULAR STRUCTURE

SOIL LOG 3

0	TO	4	INCHES	LT BRN	L	0.60	4
4	TO	8	INCHES	BRN GRY	SL	0.60	4
8	TO	19	INCHES	BRN	SL	0.60	4
	19+		INCHES	GRY	SCL	--	N/A

MAX. ROOT DEPTH: 16 SYSTEM TYPE: PRESSURIZED
MIN. MOTTLING DEPTH: NONE
DEPTH TO STANDING WATER: NONE
UPPER HORIZONS EXHIBIT MODERATE TO STRONG GRANULAR STRUCTURE

SCS DESIGNATION: NOT DETERMINED

KEY TO ABBREVIATIONS:
Soil Textures: C = CLAY; CL = CLAY LOAM; CS = COARSE SAND; FS = FINE SAND; L = LOAM; LFS = LOAMY FINE SAND;

LCS = LOAMY COARSE SAND; LMS = LOAMY MEDIUM SAND; LVFS = LOAMY VERY FINE SAND; MS = MEDIUM SAND;
OM = ORGANIC MATERIAL; SCL = SANDY CLAY LOAM; SICL = SILTY CLAY LOAM; SIL = SILT LOAM; SL = SANDY LOAM;

Soil Colors: BLK = BLACK; BRN = BROWN; DK = DARK; GRY = GRAY; OL = OLIVE; ORG = ORANGE; Y = YELLOW
Soil Modifiers: BLKY = BLOCKY; CMT = CEMENTED; COB = COBBLY; CPT = COMPACT; GRAN = GRANULAR;
RK = ROCKY; GRV = GRAVELLY; HP = HARD PAN; MT = MOTTLED; V = VERY; X = EXTREMELY;

PM = DOUGLAS FIR; TP = WESTERN RED CEDAR; TH - WESTERN HEMLOCK; AR = RED ALDER; AM = BIG LEAF MAPLE

PB = COTTONWOOD; RS = SALMONBERRY; OC = INDIAN PLUM; GS = SALAL; SW = SWORD FERN

- Soil logs, as described, support the specification of drain field depth and loading rate requirements pursuant to WAC 246-272A and Skagit County Health Department regulation
- DO NOT alter soil conditions in in designated drain field or reserve area including by vegetation removal;
- Grading, clearing, compaction, or other soils alteration/movement in the drain field area can destroy the site's ability to support an on-site septic system.
- Drain field site preparation shall be performed only under the direction of the designer or licensed installer of record
- Application Rate is expressed in gallons/square foot/day

ON-SITE WASTEWATER TREATMENT SYSTEM
STATE OF WASHINGTON
5100137
David B. Mitchell
LICENSED DESIGNER
EXPIRES 03/18/2024

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fax (360) 445-4311
david@mitchellseptic.com

CLIENT NAME/JOB # Carson / 216050
PROPERTY ID# P47501 / 360301-0-004-0000
DRAWN BY DBM DATE Sept. 28, 2022
SCALE NTS SHEET NO. 7 OF 14

Design Commentary

Proposal: on-site septic system permit to support a building permit for the construction of a new, 3 bedroom single family residence.

Note: A Site/Soil Evaluation was completed previously for this parcel under SW06—0749

Install New:

Gravity transmission line using 4" 3034 PVC sewer pipe connecting house to new 1000 gallon septic tank.

- Install cleanout in line within 2' of house as indicated on Septic Tank detail

Septic Tank:

- New 1000 gallon, concrete, 2 compartment tank
- Fit outlet with Zabel A100-8 filter or equivalent
- Fit with 24" diameter risers extending to finished grade
- feeds, via 4" PVC 3034:

Pump chamber:

- New 1000 gallon, concrete, single compartment tank
- Fit with 24" diameter riser extending to finished grade
- Install control valve in pump chamber use to adjust squirt height in mound to 60"
- Houses floats and pump

Pump: Orenco High Head Effluent Pump Model P300511-20 or equivalent based on location of house shown;

Control Panel: Rhombus IFS11W914H4D8AC or approved better. Panel includes high water alarm, dose timing, event counter and elapsed time meter.

- Theoretical timer settings are shown on attached pressure distribution analysis
- Actual settings are determined by on-site drawdown test not to exceed daily design flow
- Avoid placement of panel on exterior bedroom walls

1.5" sch 40 PVC transmission line:

- Approximately 70 linear feet required; connects pump to new

Mound: sized for 3 bedrooms:

- basal area as shown on attached drawing

Mound Bed 7.5' wide x 48' long:

- 3 x 1.25 inch center fed PVC laterals.
- Each lateral is ~47 feet long and each has 20, 1/8 inch diameter orifices
- Adjust squirt height to 60" using valve in pump chamber.
- Observation/Maintenance port at distal end of each lateral (6 total).
- Use clean drain rock in bed.
- Orient orifices to 12 o'clock position. Install orifice shields prior to backfill.

Mound: sized for 3 bedrooms

- 7.5'L x 48'W bed with 3 center fed laterals
- Observation/Maintenance port at distal end of each lateral (6 total).
- Use clean drain rock in bed
- Orient orifices to 12 o'clock position. Install orifice shields prior to backfill

Fittings: PVC Fittings Sch 40 per ASTM D-2466.

Piping: Gravity sewer: 4" PVC D-3034 ; Pressurized pipe: PVC Pipe Sch 40 per ASTM D-1785.

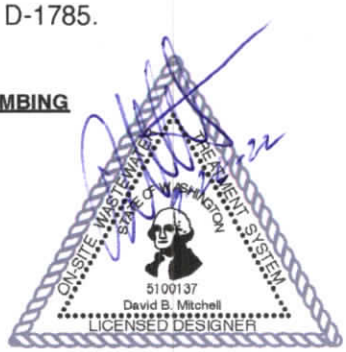
TANKS:

- ***TANKS SHALL BE PLACED DOWNHILL OF THE PROPOSED RESIDENCE OR SUCH THAT:***
- **TANKS SHALL BE INSTALLED <=12" DEEP WHILE MAINTAINING 1/4" FALL BETWEEN HOUSE PLUMBING STUB AND TANK INLET**

Reserve: 900 SQ FT drip drain field as shown

NOTE:

- **It is the Licensed Installer's responsibility to supply the pump, floats, and alarm panel and plumb the pump and floats. Wiring the pump, floats, and alarm panel is the responsibility of a Licensed Electrician. All bid documents should reflect consideration of necessary wiring work.**



EXPIRES 03/18/2024

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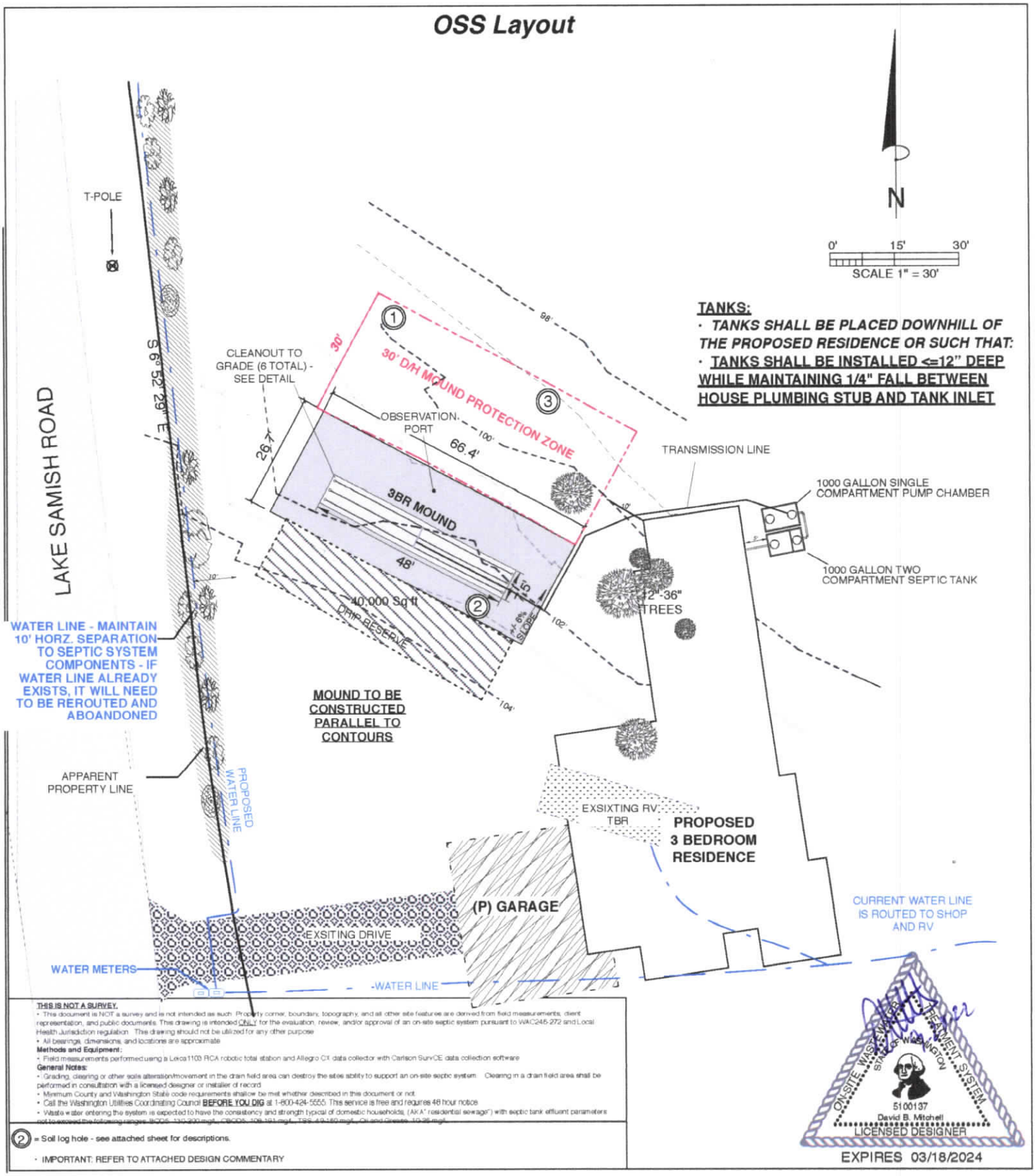
PROPERTY ID# P47501 / 360301-0-004-0000

DRAWN BY DBM DATE Sept. 28, 2022

SCALE 1" = 30' SHEET NO. 8 OF 16

OSS Layout



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• All bearings, dimensions, and locations are approximate

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• Field measurements performed using a Leica 1103 RCA robotic total station and Allegro CX data collector with Carlson SurvCE data collection software

General Notes:

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• Minimum County and Washington State code requirements shall be met whether described in this document or not

• Call the Washington Utilities Coordinating Council **BEFORE YOU DIG** at 1-800-424-5555. This service is free and requires 48 hour notice

• Waste water entering the system is expected to have the consistency and strength typical of domestic households, (AKA "residential sewage") with septic tank effluent parameters not to exceed the following ranges: BOD5 130-200 mg/L, CBOD5 109-151 mg/L, TSS 49-140 mg/L, Oil and Grease 19-26 mg/L

(2) = Soil log hole - see attached sheet for descriptions.

· IMPORTANT: REFER TO ATTACHED DESIGN COMMENTARY

ON-SITE WASTEWATER TREATMENT SYSTEM
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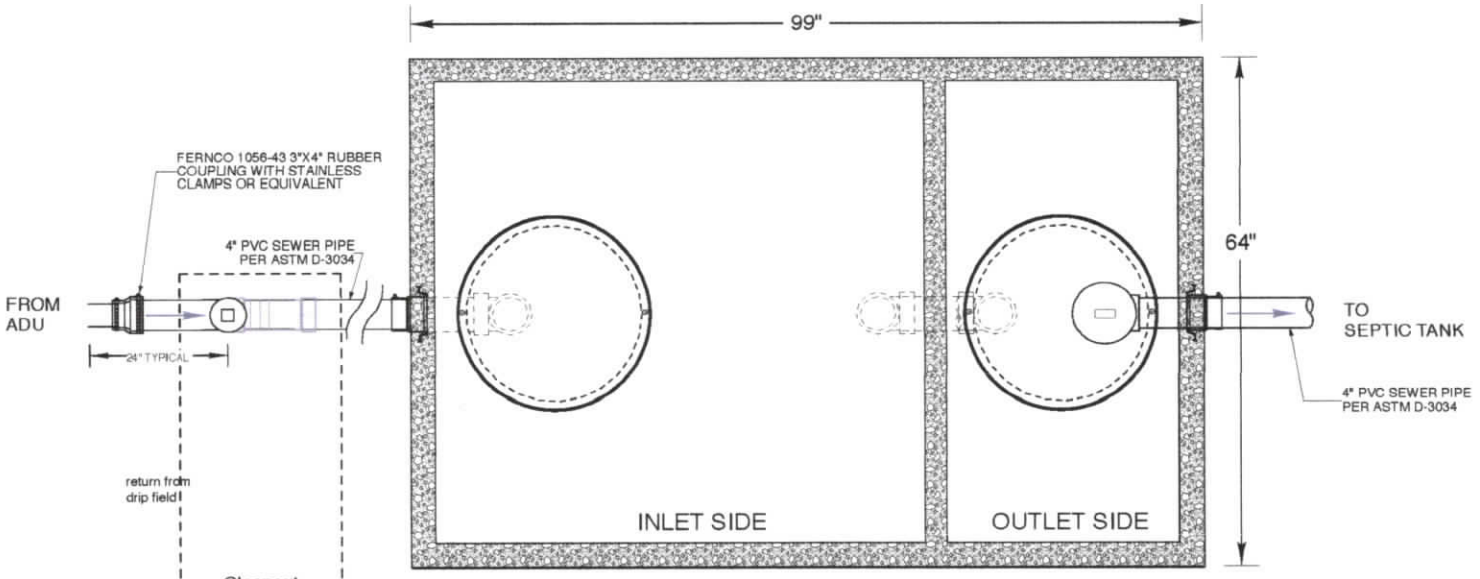
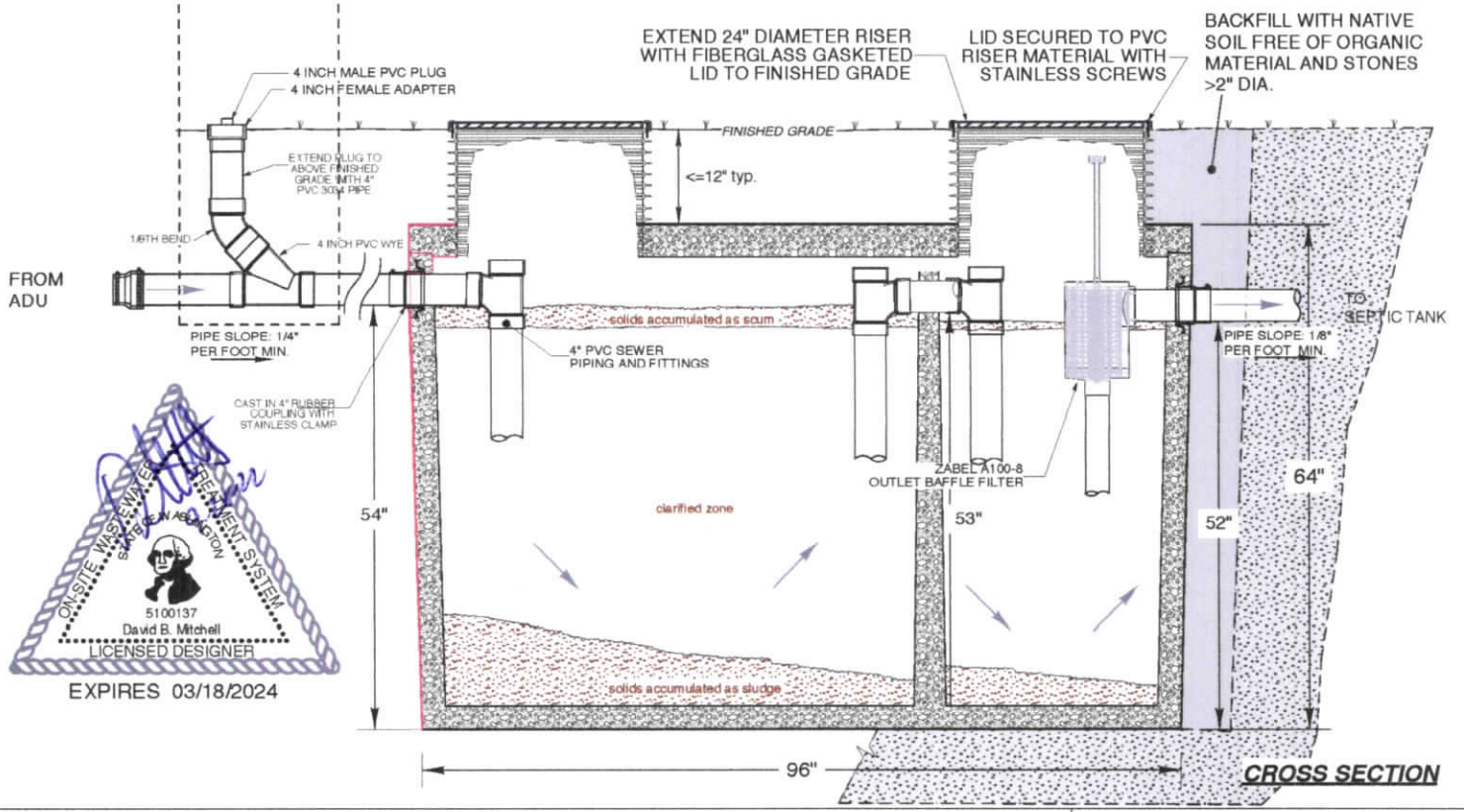
SCALE NTS SHEET NO. 9 OF 10

1000 Gallon Pre-Cast Concrete Two Compartment Septic Tank



PLAN VIEW

Cleanout Assembly



CROSS SECTION

ONSITE WASTEWATER TREATMENT SYSTEM
STATE OF WASHINGTON
5100137
David B. Mitchell
LICENSED DESIGNER
EXPIRES 03/18/2024

NOTES:
- CONFIRM DIMENSIONS WITH TANK MANUFACTURER PRIOR TO INSTALLATION.
- TANK SHALL BE WATERTIGHT AS INSTALLED.
- CALL THE WASHINGTON UTILITIES COORDINATING COUNCIL BEFORE YOU DIG AT 1-800-424-5555. THIS SERVICE IS FREE AND REQUIRES 48 HOUR NOTICE.
- WASTE WATER ENTERING THE SYSTEM IS EXPECTED TO HAVE THE CONSISTENCY AND STRENGTH TYPICAL OF DOMESTIC HOUSEHOLDS, (AKA" RESIDENTIAL SEWAGE") WITH SEPTIC TANK EFFLUENT PARAMETERS NOT TO EXCEED THE FOLLOWING RANGES: BOD5: 130-200 MG/L; CBOD5: 108-191 MG/L; TSS: 49-150 MG/L; OIL AND GREASE: 10-25 MG/L.

→ INDICATES DIRECTION OF WASTE WATER FLOW

DIMENSIONS SHOWN IN THIS DRAWING REPRESENT THE TANK PRODUCED BY BERG VAULT COMPANY (360-424-4999)

Mitchell Septic, Inc.

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fax (360) 445-4311
david@mitchellseptic.com

CLIENT NAME/JOB # Carson / 216050

PROPERTY ID# P47501 / 360301-0-004-0000

DRAWN BY DBM DATE Sept. 28, 2022

SCALE NTS SHEET NO. 10 OF 16

General Specifications and Installation Instructions for Pre-cast Concrete Tanks

1. PERMITTING

- A permit is required from the Local Health Jurisdiction (LHJ) to install a septic tank as part of an on-site septic system (OSS) installation.
- Tank installation shall be performed by an Installer licensed by the LHJ.
- The tank must be on the Washington state Department of Health approved list (http://www.doh.wa.gov/CommunityandEnvironment/WastewaterManagement/FormsPublications)

2. TANK SPECIFICATIONS:

2.1 Dimensions:

- The dimensions and detail shown in the attached tank section drawing(s) represent the tank produced by Berg Vault Company (360-424-4999).

2.2 Piping and Fittings:

- Gravity piping interior and exterior to tank shall be 4 inch PVC per ASTM D-3034 SDR 35. Fittings shall be 4 inch injection molded solvent weld SDR 35 sewer fittings manufactured in accordance with ASTM D-3034.
- The tank must be fitted with PVC baffle tees at the Inlet, intercompartmental wall, and outlet or as indicated in the tank cross-section drawing. Baffle pipe shall extend into the clarified zone, typically 40% of the liquid depth
- The outlet of the septic tank may be fitted with an outlet baffle filter as specified in the tank cross section drawing.
  - Install filter so that it can be readily removed by a technician standing at finish grade.

2.3 Tank Access and Risers:

- Risers are to be installed by the tank manufacturer and shall be a minimum of 24 inch diameter consisting of Utra-Rib™ Storm Sewer PVC pipe (or approved equal) cast into tank.
- Risers shall attach to the top of the septic tank in a manner that prevents leaking between the riser in the top of the septic tank.
- Risers shall be ordered such that they extend to at or above final grade and should be covered with a secured lid as illustrated

2.4 Seals and gaskets for inlet and outlet:

- Seals meeting ASTM C-1644 or equivalent must be used at the tank wall-to-PVC piping interface to prevent leakage

3. LOCATION, EXCAVATION, PLACEMENT, WATER TESTING, AND BACKFILL REQUIREMENTS:

3.1 Locate the tank and verify setbacks:

- The Washington Administrative Code (WAC) 246-272A-0210 - Table IV specifies minimum horizontal setbacks related to tank placement. The LHJ or design may require greater setbacks.
- Stake the septic tank area on the ground in a location shown on the site plan. Check setbacks by measuring from the edge of the septic tank to the various site features having setback requirements. If setbacks are not mad, do not proceed with tank installation.

3.2 Excavation and tank placement:

- Establish tank bottom elevation based on design specifications, tank inlet & out heights, plumbing stub elevation, transmission line length and required fall in sewage transmission line.
  - -a tank burial depth of 12 inches is specified unless the design or water table conditions suggest higher placement.
  - -add 6 inches to excavation depth elevation if bedding materials are used.
- Excavate tank hole with dimensions 2 feet larger than tank
- Bottom of excavation shall be level +/- 1/2 inch
- If large or sharp rocks are present at the bottom of the excavation, or noted in the design, place a 6 inch lift the bedding material (sand, peak gravel, 5/8 inch minus crushed rock or approved equal) and level.
  - compact and level bedding material to +/- 1/2 inch
- Place tank on compacted bedding and center of whole, keep minimum 1 foot void space on all sides. The tank shall be installed level +/- 1/2 inch
- It is the licensed installer's responsibility to construct the excavation such that it meets project specifications and WAC 296-155-657 **(Requirements for protective systems)**

3.3 Tank water tightness/ Hydrostatic testing:

- Tank shell be designed, constructed, and installed to be watertight to prevent the entrance of surface drainage or ground water into the tank.
- A water test of the septic tank in situ is required if the septic tank feeds a pump chamber housing a pump controlled by a timer.
- Hydrostatic testing shall be witnessed by the local health officer or by an individual, such as the project manager, OSS designer, or as designated by the local health officer
  - hydrostatic testing procedure:
    a. Seal empty tank
    b. Seal access openings, risers and inlet and outlet
    c. Fill the empty tank with water to a point at least 2 inches above the point of Riser connection to the top of the tank. What the tanks stand for one hour. If there is a measurable drop in the tank surface elevation, refill the tank and let the tank stand for one hour. The tank passes the water tightness test wants the water level is held for one hour without any measurable loss. Thanks shall not be rejected for damp spots on the exterior concrete surface.
    d. when leakage occurs, if the tank is not rejected by the LHJ, an additional water tightness test should be made on the tank after repairs have been completed. The test must be completed in accordance with this section.
    e. after testing: remove water tank only to the elevation of the outlet invert.

3.4 Tank backfill and connections:

- Backfill tank excavation in even 6 inch lifts using native soil free of organic material and rocks greater than 1 inch diameter or as approved by the LHJ or designer of record. Hand tamp - do not use mechanical compaction.
  - -no voids should remain between the tank walls in the native, undisturbed soil.
- Backfill to the level of the tank inlet and outlet piping then remove seals using water testing and install 4 inch PVC sewer inlet and outlet piping.
- Continue backfill in 6 inch lift to final grade.
- Contour final grade to direct surface water away from tank lids.

4. LICENSED INSTALLER'S RESPONSIBILITIES:

The Licensed Installer shall:

- Be responsible for maintaining compliance with all local and State rules governing installation whether detailed in this document or not.
- Determine the inspection requirements of both the LHJ and the designer record.
- **Coordinate and pay for inspections.**
- Confirm tank dimensions with manufacturer prior to installation.

EXPIRES 03/18/2024

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PROPERTY ID# P47501 / 360301-0-004-0000
DRAWN BY DBM DATE Sept. 28, 2022
SCALE NTS SHEET NO. 11 OF 16

Septic Tank Outlet Filter
Zabel Model A100-8™

A100/300™-8" Series

A smaller version of the original ZABEL® Disc Dam Filter, the A100/300-8™ Series is becoming a popular choice for applications where increased effluent quality is desired.

A100-8™ Series

The A100-8 is ideal for single and multi-family residential applications or light commercial settings where increased flows or higher quality effluent are required. The A100-8 is sized to handle flow rates from 1200 to 2400 gpd and is available in three different lengths. Every A100-8 is housed in ZABEL's Versa-Case to provide ease of installation with features such as a dual hub that solvent welds to either 4" or 6" SCH 40 pipe, reducer built into the bottom of the case, and optional supplemental filtering slots on the outlet to prevent solids carryover during servicing.

1/16" Filtration *Available lengths 18", 26" & 32"*

Features	A100 Series
Filtration	1/16"
Gallons Per Day	1200 - 6000
Linear Feet of Filtration	78 - 338
SmartFilter Switch and Alarm	Available
Available Filter Dimensions	8x18, 8x26, 8x32 12x20, 12x28, 12x36
Disc Dam Technology	x
Extend & Lok Compatible	x
NSF Certification	x
Installed in Multiples for Larger Flows	x
Applications	
Residential	x
Residential Multi-Family	x
Commercial	x
Grease Traps	
High TSS Removal	x
Benefits	
Extends Life of Leaching Fields	x
Keeps Solids in Septic Tank	x

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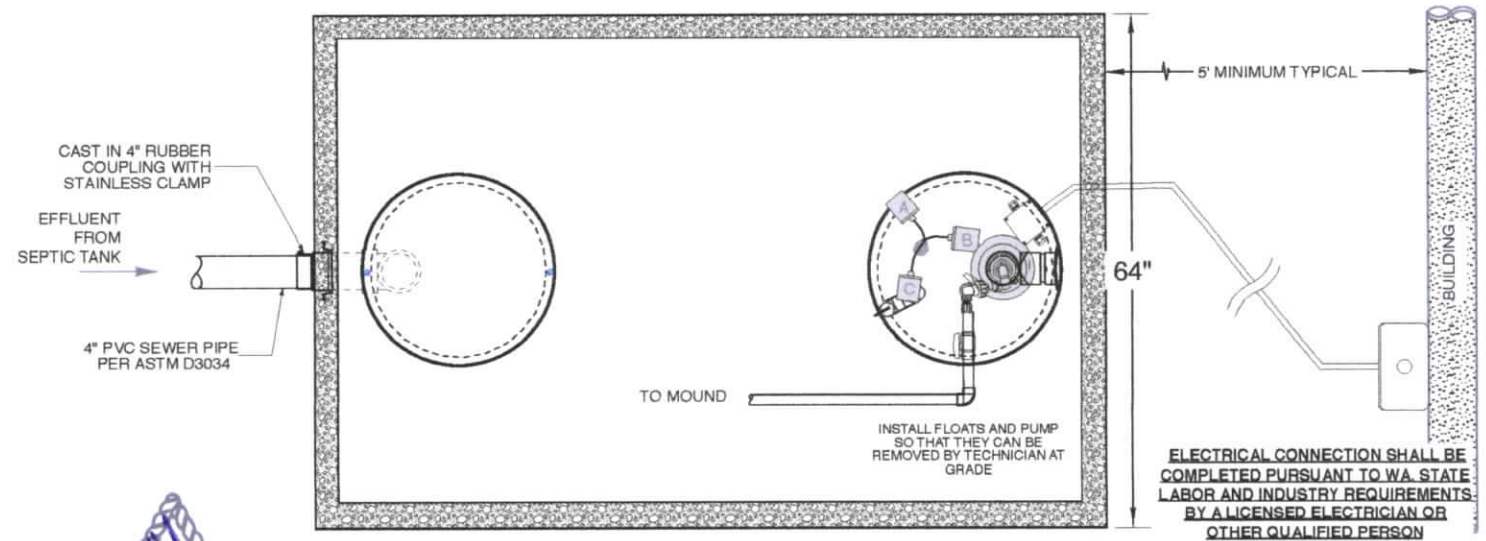
DRAWN BY DBM DATE Sept. 28, 2022

SCALE NTS SHEET NO. 12 OF 16

1000 Gallon Pre-cast Concrete Single Compartment Pump Chamber

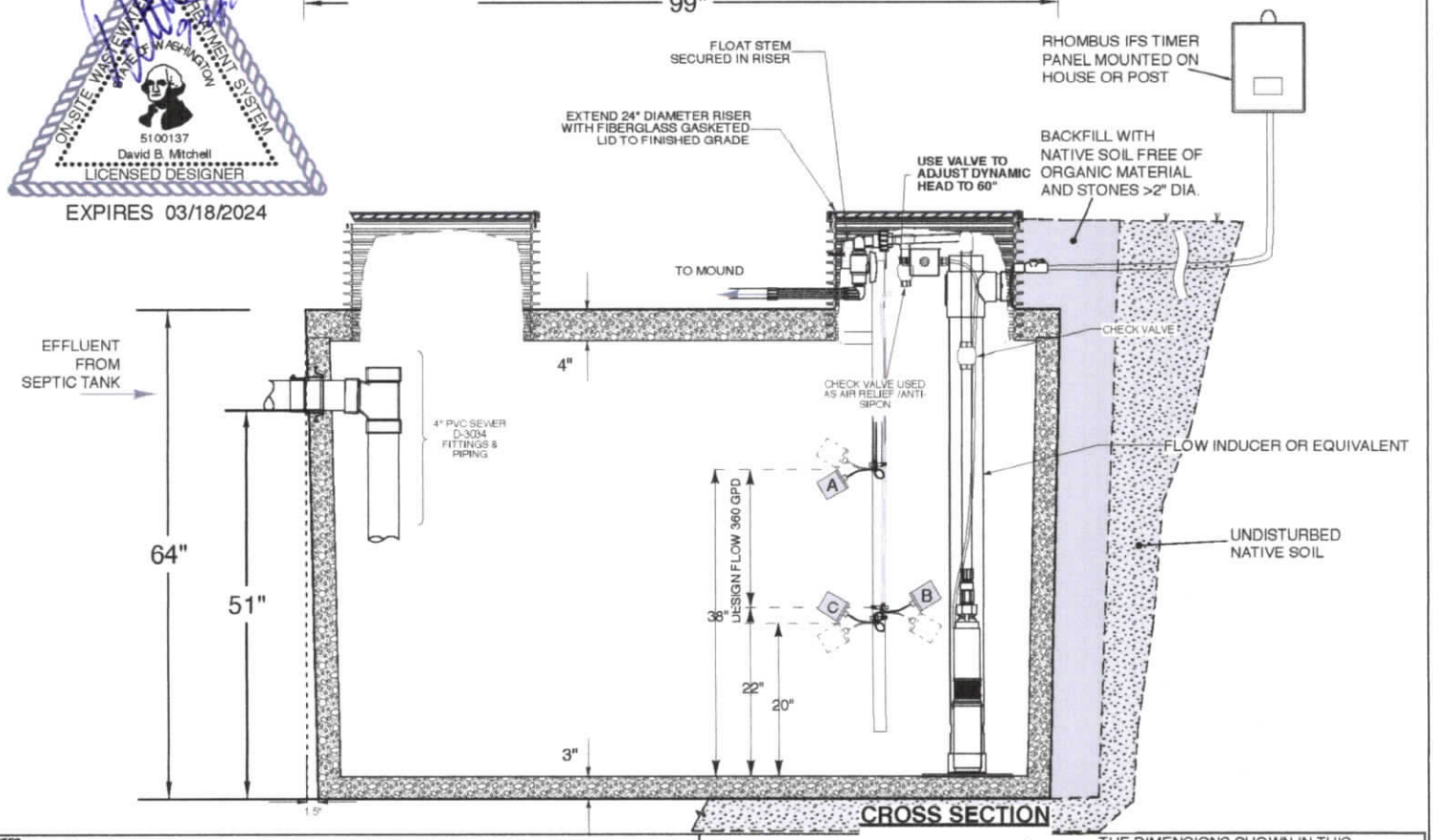


PLAN VIEW

99"

ON-SITE WASTEWATER TREATMENT SYSTEM
STATE OF WASHINGTON
5100137
David B. Mitchell
LICENSED DESIGNER

EXPIRES 03/18/2024



CROSS SECTION

NOTES:
- CONFIRM DIMENSIONS WITH TANK MANUFACTURER PRIOR TO INSTALLATION.
- PIPING & FITTINGS IN AND AROUND TANKS SHALL BE: 4" PVC SEWER PER ASTM D-3034 SDR 35
- TANK SHALL BE WATER TIGHT AS INSTALLED.
- **CALL THE WASHINGTON UTILITIES COORDINATING COUNCIL BEFORE YOU DIG AT 1-800-424-5555. THIS SERVICE IS FREE AND REQUIRES 48 HOUR NOTICE.**
- WASTEWATER ENTERING THIS SYSTEM IS EXPECTED TO HAVING THE CONSISTENCY AND STRENGTH TYPICAL OF DOMESTIC HOUSEHOLDS IE. SEPTIC TANK EFFLUENT PARAMETERS NOT EXCEEDING THE FOLLOWING RANGES: BOD5: 130-200 MG/L, CBOD5: 108-191 MG/L, TSS: 49-150 MG/L, OIL AND GREASE: 10-25 MG/L

→ DESIGNATES DIRECTION OF LIQUID WASTE FLOW

FLOAT A = HIGH WATER ALARM
FLOAT B = TIMER ON/OFF
FLOAT C = REDUNDANT OFF (OPTIONAL)

THE DIMENSIONS SHOWN IN THIS DRAWING REPRESENT A TANK PRODUCED BY BERG VAULT COMPANY (360-424-4999). A SAME VOLUME CUZ CONCRETE (360-435-5531), WATER TIGHT SEPTIC TANK IS AN ACCEPTABLE ALTERNATIVE.

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SCALE NTS

Pump Chamber Electronics

CONTROL PANEL: IFS11W914H4D8AC

INSTALLER FRIENDLY SERIES® - IFS Single Phase Simplex

Single phase, simplex demand dose or timed dose, float or C-Level™ controlled system for pump control and system monitoring.

The IFS simplex control panel is designed to control one 120, 208, 240 VAC single phase pump in water and sewage installations. The panel features an easy-to-use touch pad with display on the inner door for programming and system monitoring. The panel configuration can be easily converted in the field to either a timed dose or demand dose.

The optional C-Level™ sensor is a pressure transducer that senses the liquid level in the tank and sends a signal to the IFS panel. Pump activation levels can be adjusted by using the panel touch pad. C-Level™ CL40 sensor operating range is 3-39.8 inches (7.6-101.1 cm). C-Level™ CL100 operating range is 3-99.5 inches (7.6-252.7 cm).

TOUCH PAD FEATURES

A. **Level Status Indicators** illuminate when floats or set points are activated. Alarm will activate if a float operates out of sequence.

B. **HOA (Hand-Off-Automatic) Buttons** control pump mode with indication. Hand mode defaults to Automatic when stop level or redundant off level is reached.

C. **Pump Run Indicator** illuminates when pump is called to run.

D. **LED Display** shows system information including: levels in inches or centimeters (C-Level™ only), mode, pump elapsed time (hh:mm), events (cycles), alarm counter, float error count, timed dose override counter (timed dose only), and ON/OFF times (timed dose only).

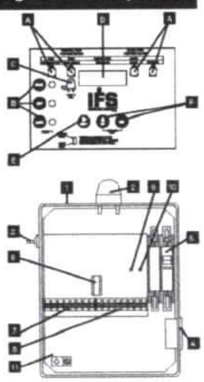
E. **NEXT Push Button** toggles display.

F. **UP and SET Push Buttons** set pump ON/OFF times (timed dose only) or activation levels (C-Level™ only).

PANEL COMPONENTS

1. **Enclosure** measures 12x10x6 inches (30.48x25.4x15.24) NEMA 4X (ultraviolet stabilized thermoplastic, padlockable with integral mounting flanges, drip shield, (2) heavy duty cover latches, and stainless steel ¼ turn set screw; for outdoor or indoor use). Note: added options, voltage, and amp range selected may change enclosure size and enclosure features, and component layout.
2. **Red Alarm Beacon** provides 360° visual check of alarm condition.
3. **Exterior Alarm Test/Normal/Silence Switch** allows horn and light to be tested and horn to be silenced in an alarm condition. Alarm automatically resets once alarm condition is cleared.
4. **Alarm Horn** provides audio warning of alarm condition (83 to 85 decibel rating).
5. **Circuit Breaker** (optional) provides pump disconnect and branch circuit protection.
6. **Power Relay** controls pump by switching electrical lines. Definite purpose contactor used when pump full load amps are above 15.
7. **Float Connection Terminal Block**
8. **Incoming Control/Alarm Power & Pump Terminal Block**
9. **Control Power Indicator/Fuse** indicator light illuminates if control power is present in panel. Alarm will activate if control fuse is blown.
10. **Alarm Power Indicator/Fuse** indicator light illuminates if alarm power is present in panel.
11. **Ground Lug**

NOTE: Schematic/Wiring Diagram and Pump Specification Label are located inside the panel on enclosure cover.



Model Shown IFS11W14XBAC

FEATURES

- Entire control system is UL Listed to meet and/or exceed industry safety standards
- Dual safety certification for the United States and Canada
- Standard package includes:
  Demand Dose - three 20' control switches
  Timed Dose - two 20' control switches
- Available with EZconnex® float system
- Complete with step-by-step installation instructions
- Five-year limited warranty

c UL us LISTED

SJE RHOMBUS.
1-888-DIAL-SJE • 1-218-847-1317
1-218-847-4617 Fax
email: customerservice@sjeinc.com
www.sjerhombus.com 8.11

SEE REVERSE SIDE FOR ORDERING INFORMATION.
SEE PRICE BOOK FOR LIST PRICE.

CONTROL PANELS

IFS	1	1	W	9	1	4	H	4D 8AC

MODEL IFS

- ☑ **MODEL TYPE**
  1 = SPLX TIMED DOSE (includes option 8AC standard)
  2 = SPLX DEMAND DOSE
- ☑ **ALARM PACKAGE**
  1 = alarm package (includes test/normal/silence switch, fuse, red light & horn)
- ☑ **ENCLOSURE RATING**
  W = NEMA 4X
- ☑ **STARTING DEVICE**
  1 = 120/208/240 VAC
  9 = 120 VAC
- ☑ **PUMP FULL LOAD AMPS**
  0 = 0-7 FLA
  1 = 7-15 FLA
  2 = 15-20 FLA
- ☑ **PUMP DISCONNECTS**
  0 = no pump disconnect
  4 = circuit breaker
  120 VAC (must select starting device option 9)
  120/208/240 VAC (must select starting device option 1)
- ☑ **SWITCH APPLICATIONS**
  H = floats (Timed dose = low level and alarm / Demand dose = stop, start, and alarm)
  X = no float
  timed dose
  demand Dose
  Note: Pump down applications only.

OPTIONS *Listed below*

If additional features are required, call the factory for a quote on an Engineered Custom control panel.

	CODE	DESCRIPTION
☐	3A	Alarm flasher
☐	3B	Manual reset alarm
☐	4A	Redundant off *(select option 4D if floats are required)*
☑	4D	Redundant off float - 20 ft. Sensor Float®
☐	6A	Auxiliary alarm contacts, form C
☑	8AC	Display board includes: ETM counter, events (cycles) counter, alarm counter, and override counter (timed dose only). Display board also required for changing a demand dose panel to timed dose panel. Demand Dose; Timed Dose *(included as standard)*
☐	10E	Lockable latch - NEMA 4X
☐	10F	Lightning arrestor *(control and alarm power combined)*

	CODE	DESCRIPTION
☐	10K	Anti-condensation heater
☐	11C	NEMA 1 remote alarm panel *(must select option 6A)*
☐	11D	NEMA 4X remote alarm panel *(must select option 6A)*
☐	15A	Control / Alarm circuit breaker
☐	16A	10' cord in lieu of 20' *(per float)*
☐	16B	15' cord in lieu of 20' *(per float)*
☐	16C	30' cord in lieu of 20' *(per float)*
☐	16D	40' cord in lieu of 20' *(per float)*
☐	17C	Sensor Float® / internally weighted ▲ *(per float)*
☐	17D	Sensor Float® / externally weighted ▲ *(per float)*
☐	17G	MilliAmpMaster™ / pipe clamp ● *(per float)*
☐	17H	MilliAmpMaster™ / externally weighted ● *(per float)*
☐	18A	Timer override option with float (timed dose only)

● Mechanically-activated ▲ Mercury-activated

Control Panel: Rhombus IFS11W914H4D8AC or approved better. Panel includes high water alarm, dose timing, event counter and elapsed time meter.
- Theoretical timer settings are shown on attached pressure distribution analysis
- Actual settings are determined by on-site drawdown test not to exceed daily design flow
- Avoid placement of panel on exterior bedroom walls

High Head Effluent Pump
Model PF300511-20

Technical Data Sheet

PF Series High-Head Effluent Pumps

Applications

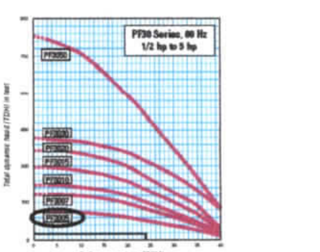
Our submersible High-Head Effluent Pumps are designed to transport screened effluent (with low TSS counts) from septic tanks or separate dosing tanks. All our pumps are constructed of lightweight, corrosion-resistant stainless steel and engineered plastics; all are field-serviceable and repairable with common tools; and all standard 60-Hz PF Series models are CSA certified to the U.S. and Canadian safety standards for effluent pumps, meeting UL requirements.

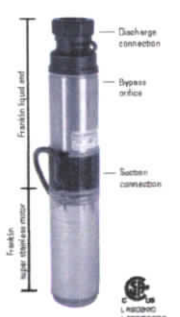
High-Head Effluent Pumps from Orenco® are used in a variety of applications, including pressurized drainfields, packed bed filters, mounds, aerobic units, effluent irrigation, effluent sewers, wetlands, lagoons, and more. These pumps are designed to be used with a Biotube® pump vault.

Features/Specifications

To specify this pump for your installation, require the following:
- Minimum 24-hour run-dry capability with no deterioration in pump life or performance*
- 1/8-inch (3-mm) bypass orifice (patent pending) to ensure flow recirculation for motor cooling and to prevent air bind
- Liquid end repair kits available for better long-term cost of ownership
- TRI-SEAL™ floating impeller design on 10-, 20-, and 30-gpm models; floating stack design on 50- and 75-gpm models
- Super stainless Franklin Electric motor, rated for continuous use and frequent cycling
- Type SOOW 600-V motor cable (suitable for Class I, Division 1 and Division 2 applications)
- Five-year warranty from date of manufacture against defects in materials or workmanship

** Not applicable for 5-hp models*





Standard Models

See specifications chart, pages 2-3, for a list of standard pumps. For a complete list of available pumps, call Orenco.

Nomenclature

PF [illegible]

PF Series High-Head Effluent Pumps (continued)

Specifications

60 Hz

EXPIRES 03/18/2024

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PROPERTY ID# *P47501 / 360301-0-004-0000*

DRAWN BY DBM DATE *Sept. 28, 2022*

SCALE NTS SHEET NO. *14* OF *16*

Mound Sizing, Pressure Distribution and Timer Settings

Mound Sizing Calculations

	Gal/day/bedroom	120	gal/day/BR	***Assumed:***	
	x Number of bedrooms	3	bedrooms	Loading rate (gal/sq. ft./day)	1.0
(GPD)	= Total Gallons per day	360	gal/day	ft. cover depth cap (H)	1.0
	Loading rate	1.0	gal/sq. ft./ day	ft. cover depth @ bed edge(G)	1.0
(A)	Bed Width (A) ft. (function of soil depth)	7.5	feet	Horz. gradient of end slope (3:1)	3
	Inches of sand under bed upslope (D)	12	inches		
	Depth of rock inches (F)	10	inches	***Friction loss formula**	
	Slope in %	6%		f = L (Q/K)^ 1.85	
				where	
(A)	**Bed Width**	**7.5**	feet	f = friction loss through pipe	
(B)	**Bed Length**	**48.0**	feet GPD/A	L = length of pipe (ft)	
(E)	Depth of fill at downslope	17.4	inches	Q = flow (gpm)	
(K)	End slope width	9.2	feet	K = constant from Table	
(J)	Upslope width	7.2	feet		
(I)	Downslope width	12.0	feet	***Discharge formula**	
(L)	**Total length**	**66.4**	feet	Q = 11.79 * d^2 * h*^.5	
(W)	**Total width**	**26.7**	feet	*where*	
				Q= orifice discharge rate (gpm)	
				d = orifice diameter in inches	
				h = residual pressure head in feet	

Mound bed/lateral/orifice calculations

	Bed square footage	360	sq. ft.
(A)	Width of 'bed'	7.5	feet
(B)	Length of 'bed'	48.0	feet
	Minimum # orifices	60	
	# laterals	3	
(C)	lateral diameter	1	inches
	orifices / lateral	20	
	orifice diameter	0.125	(1/8")
(D)	dynamic residual head ('squirt height')	60	inches
	Total orifices	60	
	Orifice discharge** given C and D	0.41	gal/min
	Total flow	**24.6**	**gal/min**
	Lateral length	47.0	(remove .5 from both ends)
	Orifice spacing inches	**28.20**	inches
	lateral spacing (function of bed width)	30	inches

Pressure Distribution Detail

3 laterals center fed by a mainfold adjusted to 60 inches dynamic residual head.
Spacing between orifices is 28.2 inches which implies 20, 0.125 (1/8") inch orifices per lateral

	# orifices	*Pipe Dia. (in.)*	*Pipe Class*	*Pipe Length (ft)*	*Flow (gpm)*	*Head Loss (ft)**	*Elevation Difference*	*Cum. Head*
Pump to Manifold		1.5	sch 40	110	24.6	4.00	15	19.00
Lateral 1	20	1	sch 40	47.0	8.20	1.80	0	1.80
Lateral 2	20	1	sch 40	47.0	8.20	1.80	0	1.80
Lateral 3	20	1	sch 40	47.0	8.20	1.80	0	1.80
Residual Head								5.00
			Totals					**29.40**

Pump Specification

Use OSI P3005 or equivalent to meet pressure distribution requirements of 24.6 gpm at 29.4 feet head

Theoretical Timer Settings

-set timer based on actual performance to drain field

	('normal' time regime)		('Veto' time regime)	
assumed usage per day	180	gal/day	360	gal/day
flow to drain field	24.6	gal/min	24.6	gal/min
total minutes on to DF per day	7.32	min/day	14.63	min/day
on time	**0.91**	**minutes**	**1.22**	**minutes**
dose volume	22.5	gal	30.0	gal
cycles / day	8		12	
off time	**3.00**	**hours**	**2.00**	**hours**

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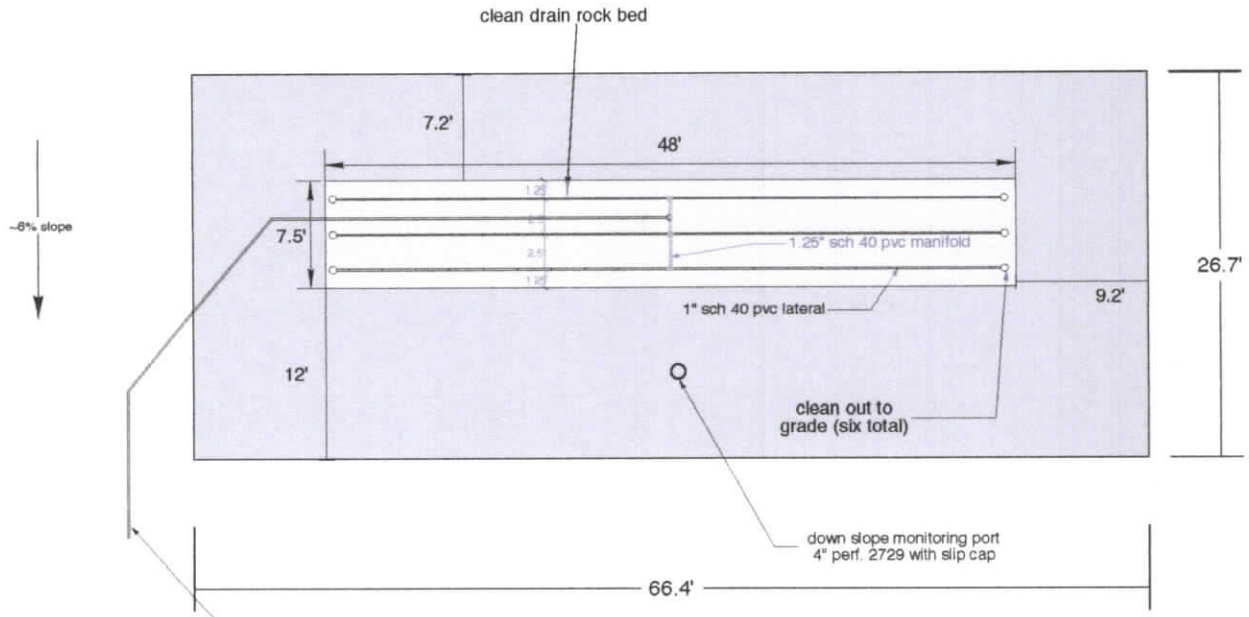
PROPERTY ID# P47501 / 360301-0-004-0000

DRAWN BY DBM DATE Sept. 28, 2022

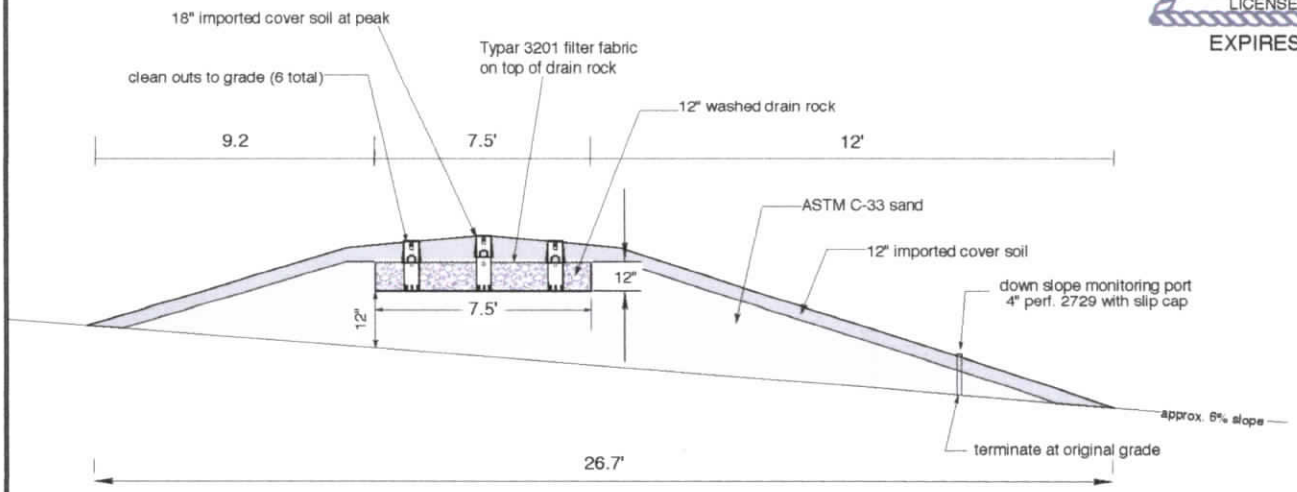
SCALE NTS SHEET NO. 15 OF 16

Mound Layout Detail



Plan View

ONSITE WASTEWATER TREATMENT SYSTEM
STATE OF WASHINGTON
5100137
David B. Mitchell
LICENSED DESIGNER
EXPIRES 03/18/2024



Cross Section

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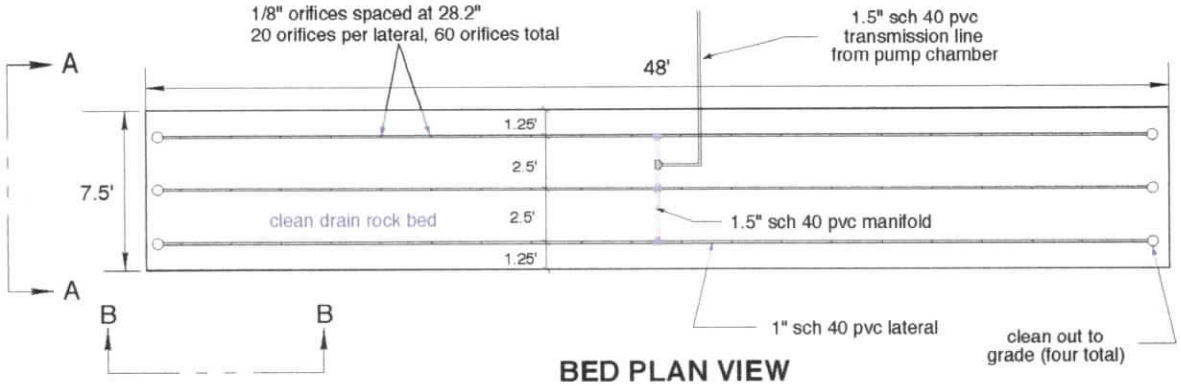
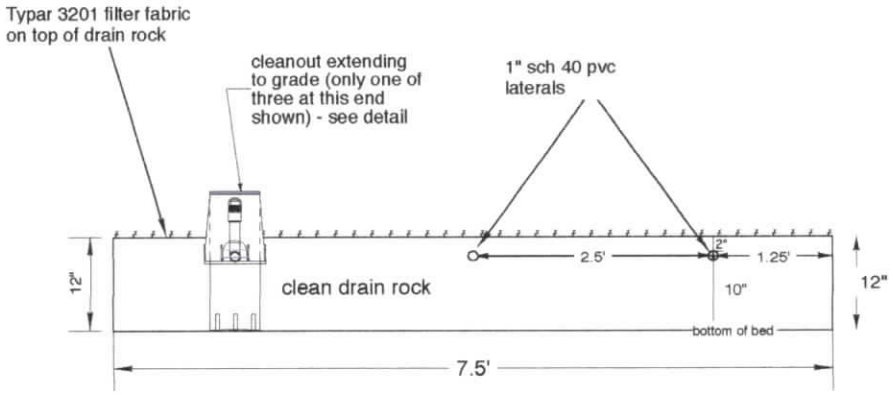
SCALE NTS SHEET NO. 16 OF 16

Mound Bed Details



BED PLAN VIEW



SECTION A -
BED END VIEW - SAND AND COVER SOIL NOT SHOWN

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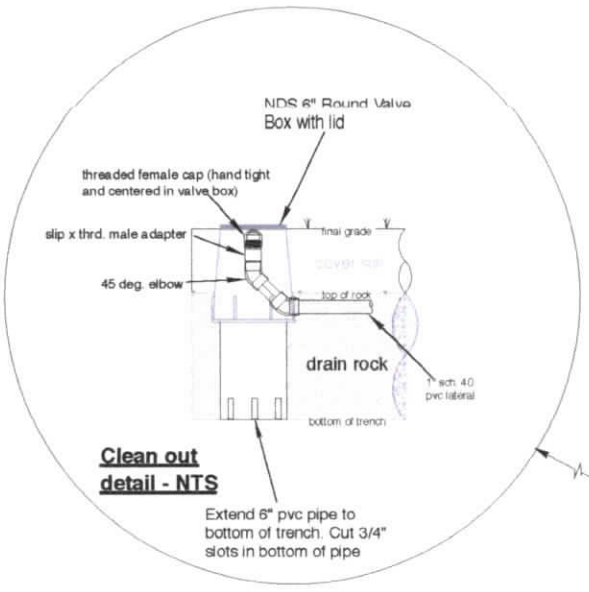
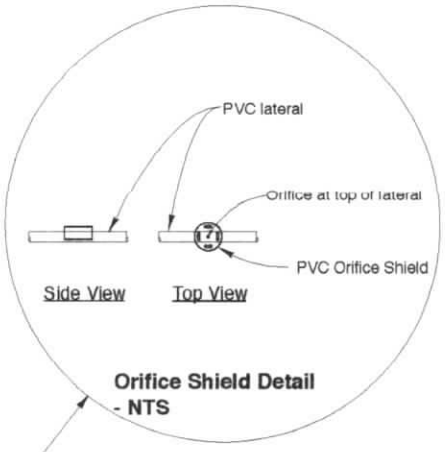
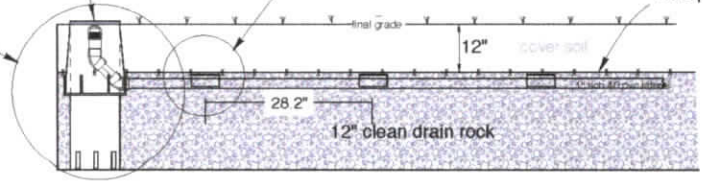


Clean out detail - NTS



Orifice Shield Detail - NTS

install valve box over
cleanout assembly
make lid flush with final
ground level



SECTION B -
CLEANOUT END VIEW

All pressure fittings shall be schedule 40

SNOHOMISH HEALTH DISTRICT
WWW.SNOHD.ORG

Application For An On-Site Sewage System Permit

GENERAL APPLICATION INFORMATION

PROPERTY TAX ACCOUNT #: 00489700302900	**LOT #:** 29-30	Sec: 34 Twp: 31 Rg: 04

■ New ☐ Expedited ☐ Renewal ☐ Redesign ☐ Alteration ☐ Repair ☐ Waiver Review

Applicant Name: IWALANI HARRIS	Plat / SP Name: GOODWIN WATERFRONT TRACTS		
Mailing Address: 2219 SAWDUST ROAD, SUITE 805	City: THE WOODLANDS	State: TX	Zip: 77380
Applicant Phone: 281-825-6110	Applicant Email: ARON@WESTCOPM.COM		
Installation Address: 1500 39TH AVE NW	Installation City: STANWOOD		Zip: 98292

Water Supply: Individual Well _____ Public YES Name 7 LAKES WATER DISTRICT

SEWAGE DISPOSAL SYSTEM DESIGN INFORMATION

Type of Building: ■ New ☐ Existing ■ SFR ☐ Duplex ☐ Commercial ☐ Other _____ # of Bedrooms 5

Pretreatment Type: ☐ SF ☐ ATU ☐ PBF ■ N/A ☐ Other _____

Dispersal Type: ☐ Gravity ■ LPD ☐ SSD ☐ Mound ☐ SLB ☐ Other _____

Lot Size: 1.36 ACRES Operating Capacity: 360 (gallons/day) Design Flow: 600 (gallons/day)

% Slope in Drainfield Area: 10% Depth to Water Table/Restrictive Layer: 40 (inches) Soil Texture Type (1-6): 4

Application Rate: .6 (gal/sq ft/day) Absorption Area: 1000 (sq ft) Installation Depth: 13 (inches)

Septic Tank Size: 1750 (gallons) Pump Chamber Size: 1750 (gallons) Date Soils Logged: 10.25.22

Required Cover Soil: Volume: 60 (cubic yards)

DESIGNER INFORMATION

Designer Name (Printed): David Mitchell	Designer Signature: David Mitchell
Address: 19712 E. Conway Hill Lane / Mount Vernon / WA / 98274	License Number: 5100137
Email: david@mitchellseptic.com	Phone: 360-421-3600
Fee Simple Owner, Contract Purchaser or Owner's Authorized Agent's Name (Printed): David Mitchell	Fee Simple Owner, Contract Purchaser or Owner's Authorized Agent's Signature: David Mitchell

Designer Comments:

HEALTH DISTRICT USE ONLY

☐ APPLICATION APPROVED EHS _____ Date _____ APPROVAL EXPIRES ON: _____

Comments/Conditions:

☐ APPLICATION DISAPPROVED EHS _____ Date _____

Environmental Health Division
3020 Rucker Avenue, Suite 104 ■ Everett, WA 98201-3900 ■ fax: 425.339.5254 ■ tel: 425.339.5250

Mitchell Septic, Inc.

David Mitchell
Licensed Designer
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Mount Vernon, WA 98274
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fax (360) 445-4311
david@mitchellseptic.com

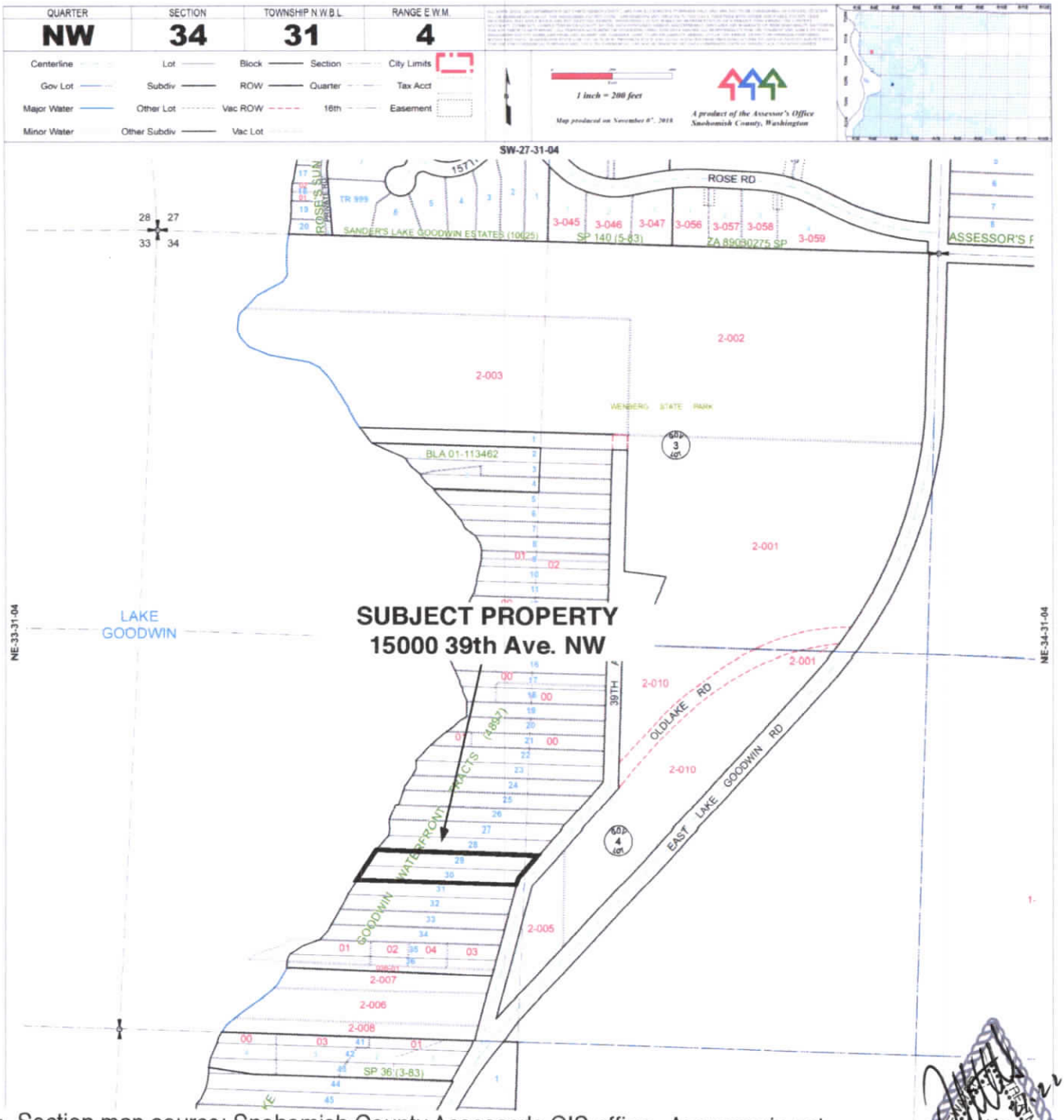
CLIENT NAME/JOB # Harris / 220127

PROPERTY ID# 00489700302900

DRAWN BY DBM DATE Nov. 21, 2022

SCALE NTS SHEET NO. 2 OF 16

Section Map



- Section map source: Snohomish County Assessor's GIS office. Accuracy is not guaranteed.
- All bearings, dimensions and locations are approximate.
- Map is intended to show parcel in context of neighboring properties and to assist in site location.

ONSITE WASTEWATER TREATMENT SYSTEM DESIGNER WASHINGTON
5100137
David B. Mitchell
LICENSED DESIGNER

EXPIRES 03/18/2022

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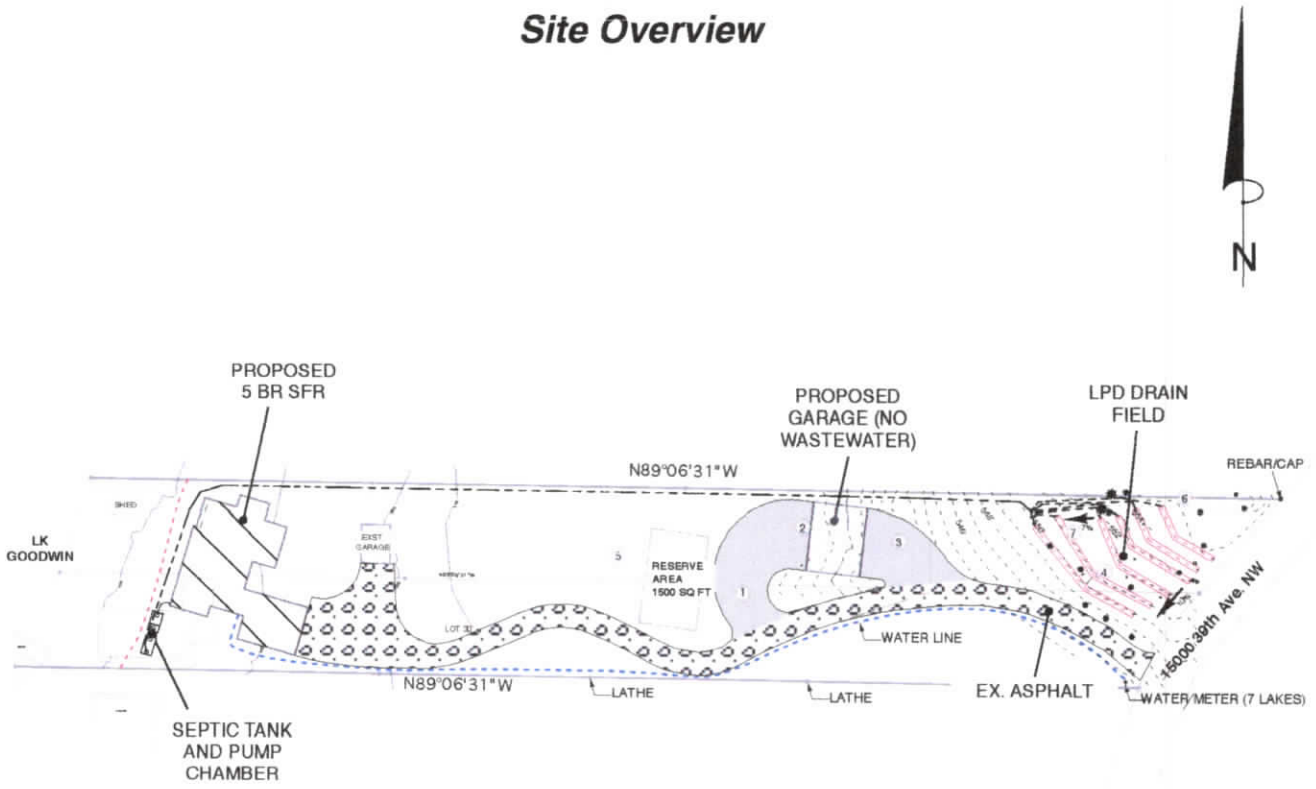
CLIENT NAME/JOB # *Harris / 220127*

PROPERTY ID# *00489700302900*

DRAWN BY DBM DATE *rv Nov. 30, 2022*

SCALE 1" = 100' SHEET NO. 3 OF 16

Site Overview



NOTES

- **SPECIFIED CONTROL PANEL IS 220V AND HIGH HEAD PUMP IS 220V 1.5 HP**
- ***USE 80 PVC FITTINGS INSIDE PUMP CHAMBER***
- **CONCRETE TANKS SHOWN; POLYETHYLENE TANKS OF EQUIVALENT SIZE ARE ACCEPTABLE WHERE INSTALLATION HONORS SHORELINE SETBACK**
- **TANK INSTALLATION TO BE CAREFULLY COORDINATED WITH EX. HOUSE DEMOLITION AND NEW FOUNDATION CONSTRUCTION.**
- **TANK INSTALLATION PRIOR TO FOUNDATION CONSTRUCTION LIKELY REQUIRED**
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- **IMPORTANT: REFER TO ATTACHED DESIGN COMMENTARY**

(1) = Soil log hole - see attached sheet for soil descriptions.

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0' 50' 100'
SCALE 1" = 100'

ON-SITE WASTEWATER TREATMENT SYSTEM
STATE OF WASHINGTON
5100137
David B. Mitchell
LICENSED DESIGNER

EXPIRES 03/18/2024

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PROPERTY ID# *00489700302900*

DRAWN BY DBM DATE *Nov. 21, 2022*

SCALE NTS SHEET NO. 4 OF 16

Soil Log Detail

EXAMINATION DATE: Oct 25, 2022
PREVIOUS WEEK PRECIPITATION: LIGHT RAIN
DOMINANT VEGETATION: AM, PM, TP
EXPECTED WATER TABLE CONDITIONS: LOW

SOIL LOG 1

HORIZON DEPTH				COLOR, MODIFIER	TEXTURE	APP. RATE	APP. TYPE
0	TO 3	INCHES		BRN	SL	0.60	4
3	TO 24	INCHES		ORG BRN	SL	0.60	4
24	TO 40	INCHES		OL	LFS	0.60	4
40+		INCHES		OL	SCL	0.20	6

MAX. ROOT DEPTH: 42 SYSTEM TYPE: PRESSURE
MIN. MOTTLING DEPTH: NONE
DEPTH TO STANDING WATER: NONE
UPPER HORIZONS EXHIBIT GRAVELLY TEXTURE

SOIL LOG 2

HORIZON DEPTH				COLOR, MODIFIER	TEXTURE	APP. RATE	APP. TYPE
0	TO 4	INCHES		BRN	SL	0.60	4
4	TO 24	INCHES		ORG BRN	SL	0.60	4
24	TO 44	INCHES		OL	LFS	0.60	4
44+		INCHES		LT BRN	SCL	0.20	6

MAX. ROOT DEPTH: 36 SYSTEM TYPE: PRESSURE
MIN. MOTTLING DEPTH: NONE
DEPTH TO STANDING WATER: NONE
UPPER HORIZONS EXHIBIT GRAVELLY TEXTURE

SOIL LOG 3

HORIZON DEPTH				COLOR, MODIFIER	TEXTURE	APP. RATE	APP. TYPE
0	TO 4	INCHES		BRN	SL	0.60	4
4	TO 25	INCHES		ORG BRN	SL	0.60	4
25	TO 43	INCHES		ORG BRN	LMS	0.80	3
43+		INCHES		LT BRN	SCL	0.20	6

MAX. ROOT DEPTH: 30 SYSTEM TYPE: PRESSURE
MIN. MOTTLING DEPTH: NONE
DEPTH TO STANDING WATER: NONE
UPPER HORIZONS EXHIBIT MODERATE TO STRONG GRANULAR STRUCTURE, PLATY LOWER HORIZANS

SOIL LOG 4

HORIZON DEPTH				COLOR, MODIFIER	TEXTURE	APP. RATE	APP. TYPE
0	TO 6	INCHES		BRN	SL	0.60	4
6	TO 22	INCHES		ORG BRN	SL	0.60	4
22	TO 40	INCHES		OL	LFS	0.60	4
40+		INCHES		LT BRN	HB	--	4

MAX. ROOT DEPTH: 28 SYSTEM TYPE: PRESSURE
MIN. MOTTLING DEPTH: NONE
DEPTH TO STANDING WATER: NONE
UPPER HORIZONS EXHIBIT GRAVELLY TEXTURE

SOIL LOG 5

HORIZON DEPTH				COLOR, MODIFIER	TEXTURE	APP. RATE	APP. TYPE
0	TO 5	INCHES		BRN	SL	0.60	4
5	TO 25	INCHES		ORG BRN	LFS	0.60	4
25+		INCHES		LT BRN	SCL	0.20	6

MAX. ROOT DEPTH: 20 SYSTEM TYPE: PRESSURE
MIN. MOTTLING DEPTH: NONE
DEPTH TO STANDING WATER: NONE
UPPER HORIZONS EXHIBIT GRAVELLY TEXTURE

SOIL LOG 6

HORIZON DEPTH				COLOR, MODIFIER	TEXTURE	APP. RATE	APP. TYPE
0	TO 4	INCHES		BRN	SL	0.60	4
4	TO 22	INCHES		ORG BRN	LFS	0.60	4
22	TO 44	INCHES		OL	LFS	0.60	4
44+		INCHES		LT BRN	SCL	0.20	6

MAX. ROOT DEPTH: 40 SYSTEM TYPE: PRESSURE
MIN. MOTTLING DEPTH: NONE
DEPTH TO STANDING WATER: NONE
UPPER HORIZONS EXHIBIT GRAVELLY TEXTURE

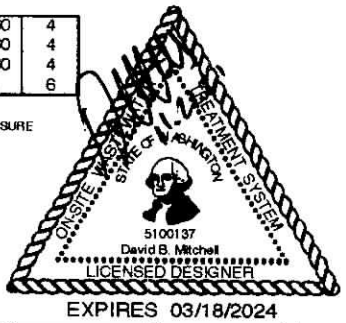
SOIL LOG 7

HORIZON DEPTH				COLOR, MODIFIER	TEXTURE	APP. RATE	APP. TYPE
0	TO 5	INCHES		DK BRN	L	0.60	4
5	TO 22	INCHES		ORG BRN	SL	0.60	4
22	TO 46	INCHES		LT BRN	FS	0.60	4
46+		INCHES		BRN GRY	HP	--	6

MAX. ROOT DEPTH: 42 SYSTEM TYPE: PRESSURE
MIN. MOTTLING DEPTH: NONE
DEPTH TO STANDING WATER: NONE
UPPER HORIZONS EXHIBIT GRAVELLY TEXTURE

SCS DESIGNATION: NOT DETERMINED

KEY TO ABBREVIATIONS:
Soil Textures: C = CLAY; CL = CLAY LOAM; CS = COARSE SAND; FS = FINE SAND; L = LOAM; LFS = LOAMY FINE SAND;LCS = LOAMY COARSE SAND; LMS = LOAMY MEDIUM SAND; LVFS = LOAMY VERY FINE SAND; MS = MEDIUM SAND;
OM = ORGANIC MATERIAL; SCL = SANDY CLAY LOAM; SICL = SILTY CLAY LOAM; SIL = SILT LOAM; SL = SANDY LOAM;Soil Colors: BLK = BLACK; BRN = BROWN; DK = DARK; GRY = GRAY; OL = OLIVE; ORG = ORANGE; Y = YELLOW
Soil Modifiers: BLKY = BLOCKY; CMT = CEMENTED; COB = COBBLY; CPT = COMPACT; GRAN = GRANULAR;
RK = ROCKY; GRV = GRAVELLY; HP = HARD PAN; MT = MOTTLED; V = VERY; X = EXTREMELY;
Notes:
- Soil logs, as described, support the specification of drain field depth and loading rate requirements pursuant to WAC 246-272A and Skagit County Health Department regulations.
- DO NOT alter soil conditions in in designated drain field or reserve area including by vegetation removal;
- Grading, clearing, compaction, or other soils alteration/movement in the drain field area can destroy the site's ability to support an on-site septic system.
- Drain field site preparation shall be performed only under the direction of the designer or licensed installer of record
- Application Rate is expressed in gallons/square foot/day



EXPIRES 03/18/2024

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(360) 421-3600
fax (360) 445-4311
david@mitchellseptic.com

CLIENT NAME/JOB # *Harris / 220127*

PROPERTY ID# *00489700302900*

DRAWN BY DBM DATE *rv Nov. 30, 2022*

SCALE NTS SHEET NO. 5 OF 16

Design Commentary

Project Description: On-site septic system to support a building permit for a 5 bedroom single family residence:
Install New:
4" 3034 PVC gravity line:
• Connect residence to tank using 4" 3034 PVC per SDR 35 maintaining 1/4"/foot minimum fall between building and septic tank inlet and such that new tanks are no greater than 12" deep. See notes on Tank layout
• Install cleanout as indicated on attached detail
Septic Tank:
• 1750 gallon, two compartment concrete tank approved for use in Washington State
• Install tanks +/- 3 feet from house outside of shoreline buffer as indicated on attached detailed sheet
• Tank to have 24" (min.) diameter, cast in place risers with gasketed lids extending to finished grade
• Fit outlet with Zabel A100-8 outlet baffle filter or approved equivalent
• Tank elevation shall be carefully established prior to digging the tank hole. See notes on Tank layout
gravity feeds, via 4" 3034 PVC with 1/8"/foot minimum fall:
Pump chamber:
• concrete, 1750 gallon, single compartment tank with risers to grade;
feeds via **1.5" PVC Sch 40 transport line**
• USE **Sch 80 PVC fittings inside pump chamber**
• Install tanks less than 5 feet from house outside of shoreline buffer. See notes on Tank layout
Valve Assembly: 1.5" header feeding 1.25 inch dia. laterals.
• Fit lines with ball valves. Use ball valves to adjust residual dynamic head to 60" in each trench
• Extend access to grade.
Pressure drain field: Designed for 5 bedroom x 120 gallons/bedroom/day equals peak loading of 600 gallons per day/ .6 gal/sq. ft./day = 1000 square feet. Configure as 6 pressurized trenches, each 3 feet wide, lengths as shown, totaling 335 lineal feet.
• Spacing between 1/8 inch orifices shall be 60" which implies a total of 56 orifices
• Orient orifices at 12 o'clock position and install orifice shields
• 4.5' minimum wall to wall spacing
• **Install using Low-Profile gravel-less vaults.**
• NO DRAIN FIELD SIZE REDUCTION SHALL BE TAKEN.
• **TANEX Cintoflex E mesh required on trench bottom prior to placing gravel-less vault to act as rodent barrier.**
• Install clean out at distal end of each lateral (6 total)
Pump: OSI high head PF3015 **(220V, 1.5 Horse power)** or pre-approved equivalent
Controls: Rhombus IFS11W114H4D8AC (**220V**) panel with timer, elapsed time meter and high water alarm or approved better
• Theoretical timer on attached sheet
• Set timer based on draw-down test at time of installation.
• MOUNT PANEL IN LOCATION WHERE NOISE FROM MOTOR CONTRACTOR WILL NOT DISTURB OCCUPANTS OF RESIDENCE
Site specific notes:
• SPECIFIED CONTROL PANEL IS 220V AND HIGH HEAD PUMP IS 220V 1.5 HP
• USE 80 PVC FITTINGS INSIDE PUMP CHAMBER
• CONCRETE TANKS SHOWN; POLYETHYLENE TANKS OF EQUIVALENT SIZE ARE ACCEPTABLE WHERE INSTALLATION HONORS SHORELINE SETBACK
• TANK INSTALLATION TO BE CAREFULLY COORDINATED WITH EX. HOUSE DEMOLITION AND NEW FOUNDATION CONSTRUCTION.
• TANK INSTALLATION PRIOR TO FOUNDATION CONSTRUCTION LIKELY REQUIRED
• INVERT OF PLUMBING STUB SHALL NOT BE GREATER THAN 23" BELOW FINISHED GRADE AT STUBOUT
Reserve: ALT system area shown
Pressure Fittings: PVC Fittings Sch 40 per ASTM D-2466 and PVC Sch 80
Piping: Gravity sewer: 4" PVC D-3034 ; Pressurized pipe: PVC Pipe Sch 40 per ASTM D-1785.
Encasing: Water lines shall maintain a minimum horizontal separation of 10' from septic system components.
• SPECIFIED CONTROL PANEL IS 220V AND HIGH HEAD PUMP IS 220V 1.5 HP
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NOTES:
• Both tanks are to be water tested prior to backfill. All tanks to have risers to finished grade.
• It is the Licensed Installer's responsibility to supply the pump, floats, and alarm panel and plumb the pump and floats. Wiring the pump, floats, and alarm panel is the responsibility of a Licensed Electrician. All bid documents should reflect consideration of necessary wiring work.

EXPIRES 03/18/2024

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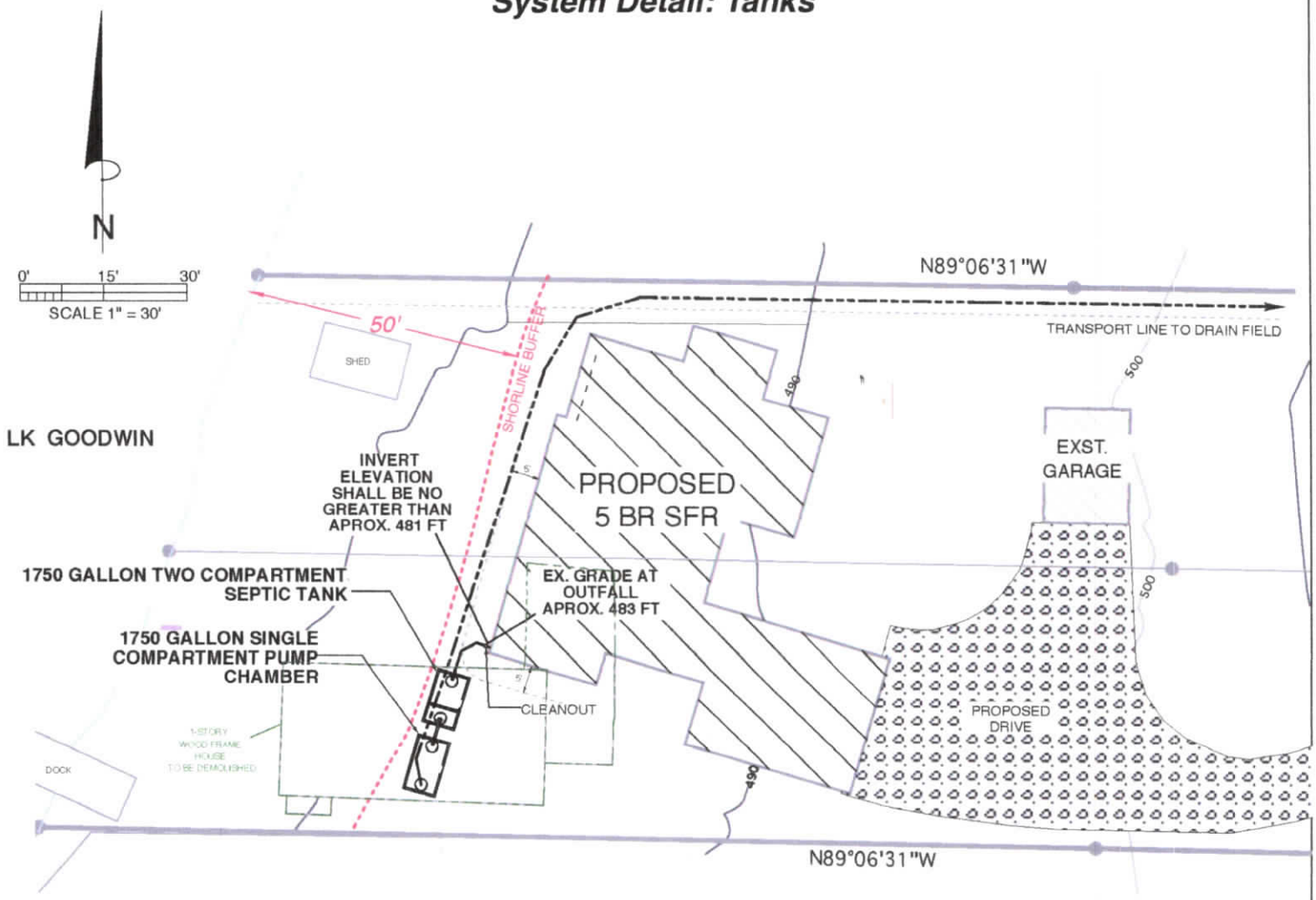
CLIENT NAME/JOB # Harris / 220127

PROPERTY ID# 00489700302900

DRAWN BY DBM DATE rv Nov. 30, 2022

SCALE 1" = 30' SHEET NO. 6 OF 16

System Detail: Tanks



NOTES

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- Wastewater entering this system is expected to having the consistency and strength typical of domestic households, (aka "Residential sewage") with Septic Tank Effluent parameters not exceeding the following ranges: BOD5: 130-200 mg/L; CBOD5: 108-191 mg/L; TSS: 49-150 mg/L; Oil and Grease: 10-25 mg/L.

ON-SITE WASTEWATER TREATMENT SYSTEM
STATE OF WASHINGTON
5100137
David B. Mitchell
LICENSED DESIGNER

EXPIRES 03 /18/2024

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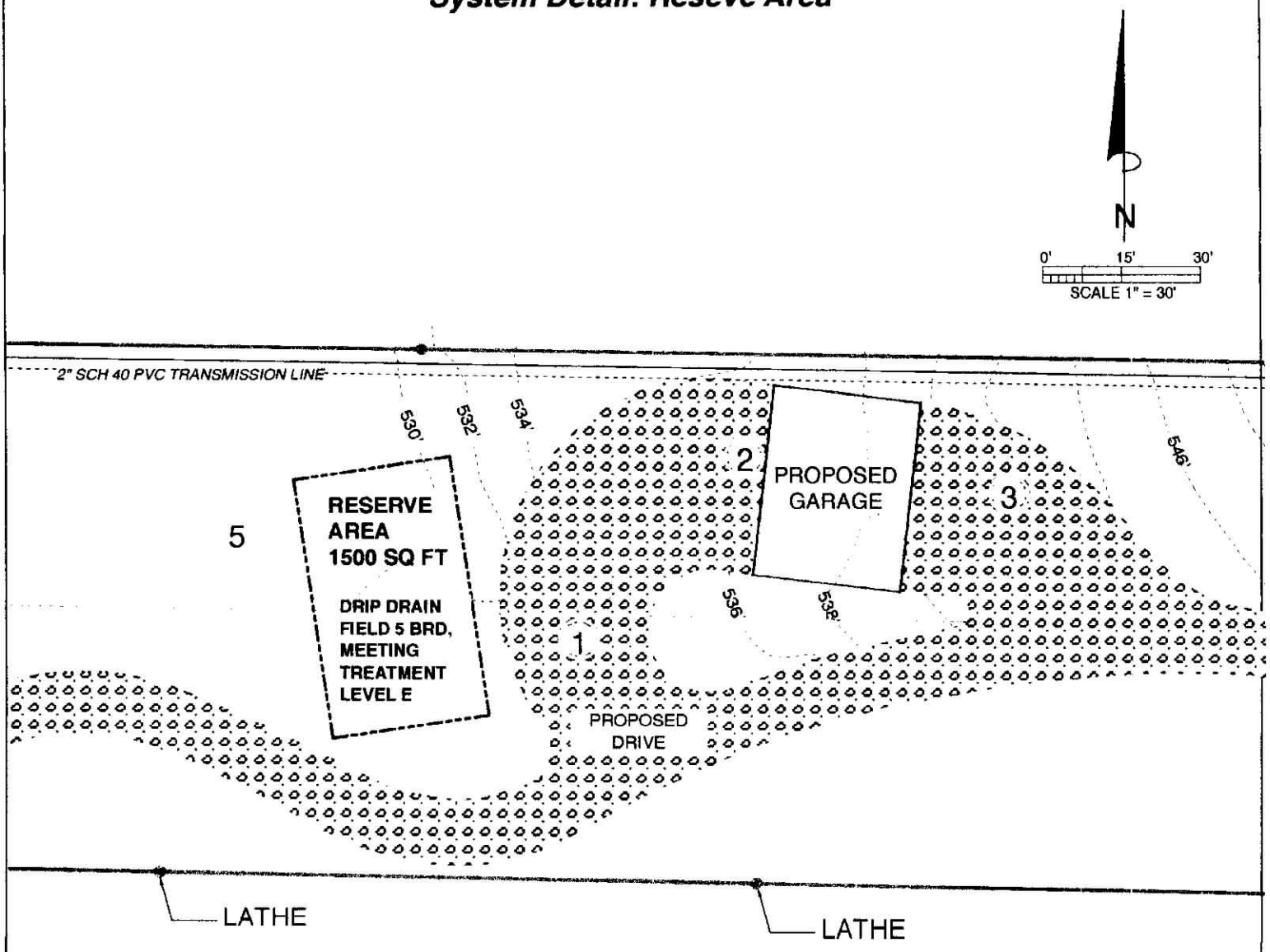
DRAWN BY DBM DATE *Nov. 21, 2022*

SCALE 1" = 30' SHEET NO. 7 OF 16

System Detail: Reseve Area



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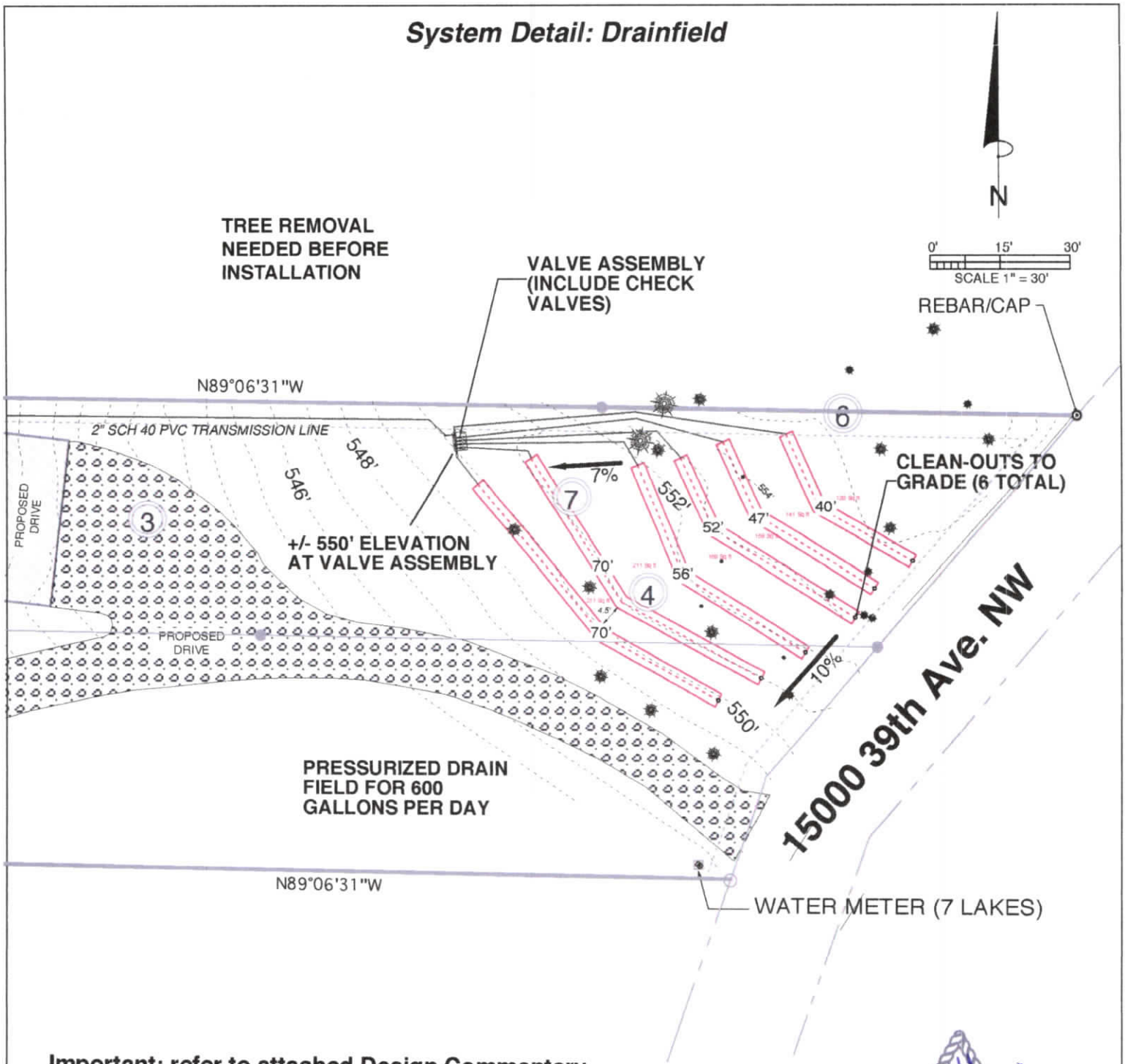
PROPERTY ID# *00489700302900*

DRAWN BY DBM DATE *rv Nov. 30, 2022*

SCALE 1" = 30' SHEET NO. 8 OF 16

System Detail: Drainfield



Important: refer to attached Design Commentary

① = Soil log hole - see attached sheet for soil descriptions.

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- Grading, clearing or other soils alteration/movement in the drain field area can destroy the site's ability to support an on-site septic system. Clearing shall be performed only after consultation with a licensed designer or installer.
- Minimum County and State code requirements shall be met whether described in this document or not.
- Wastewater entering this system is expected to having the consistency and strength typical of domestic households, (aka "Residential sewage") with Septic Tank Effluent parameters not exceeding the following ranges: BOD5: 130-200 mg/L; CBOD5: 108-191 mg/L; TSS: 49-150 mg/L; Oil and Grease 10-25 mg/L.

ONSITE WASTEWATER TREATMENT SYSTEM
STATE OF WASHINGTON
5100137
David B. Mitchell
LICENSED DESIGNER

EXPIRES 03/18/2024

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CLIENT NAME/JOB # Harris / 220127

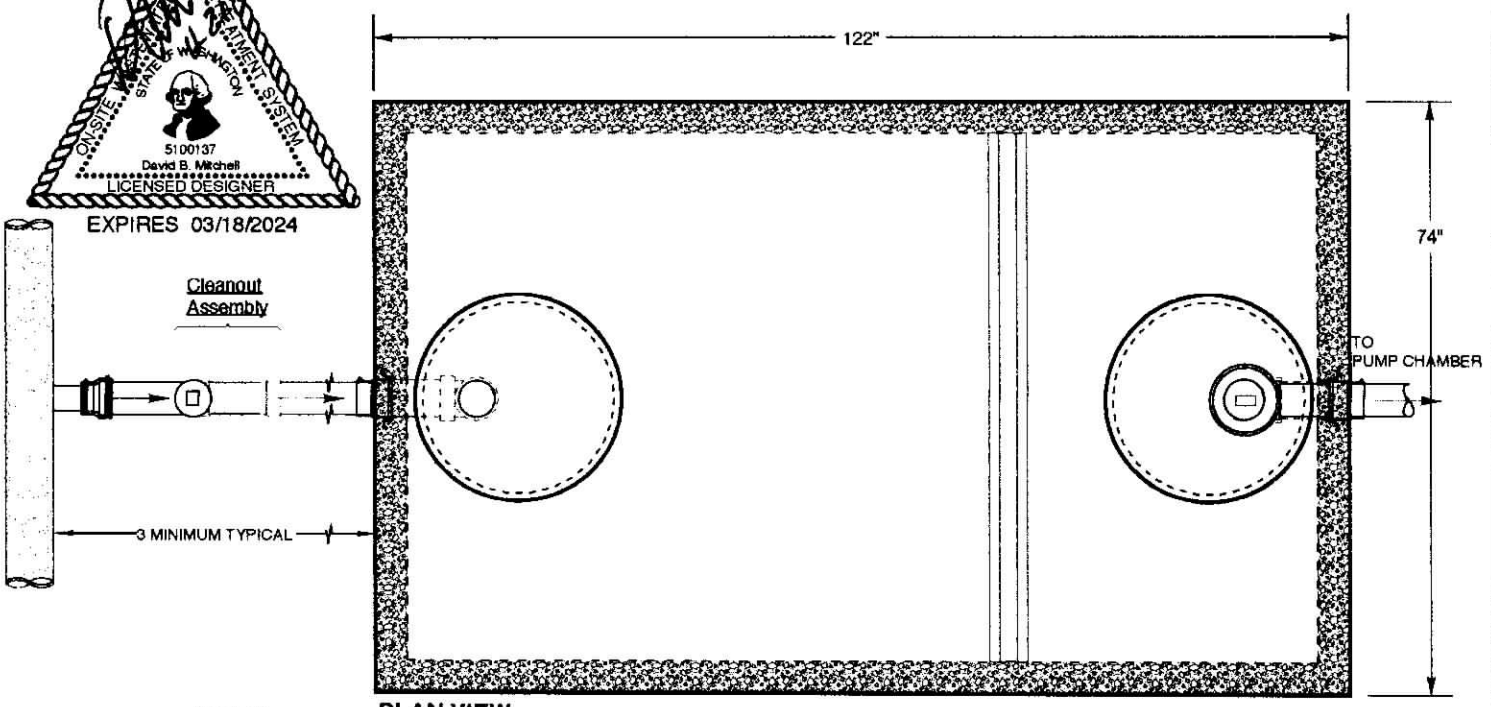
PROPERTY ID# 00489700302900

DRAWN BY DBM DATE Nov. 21, 2020

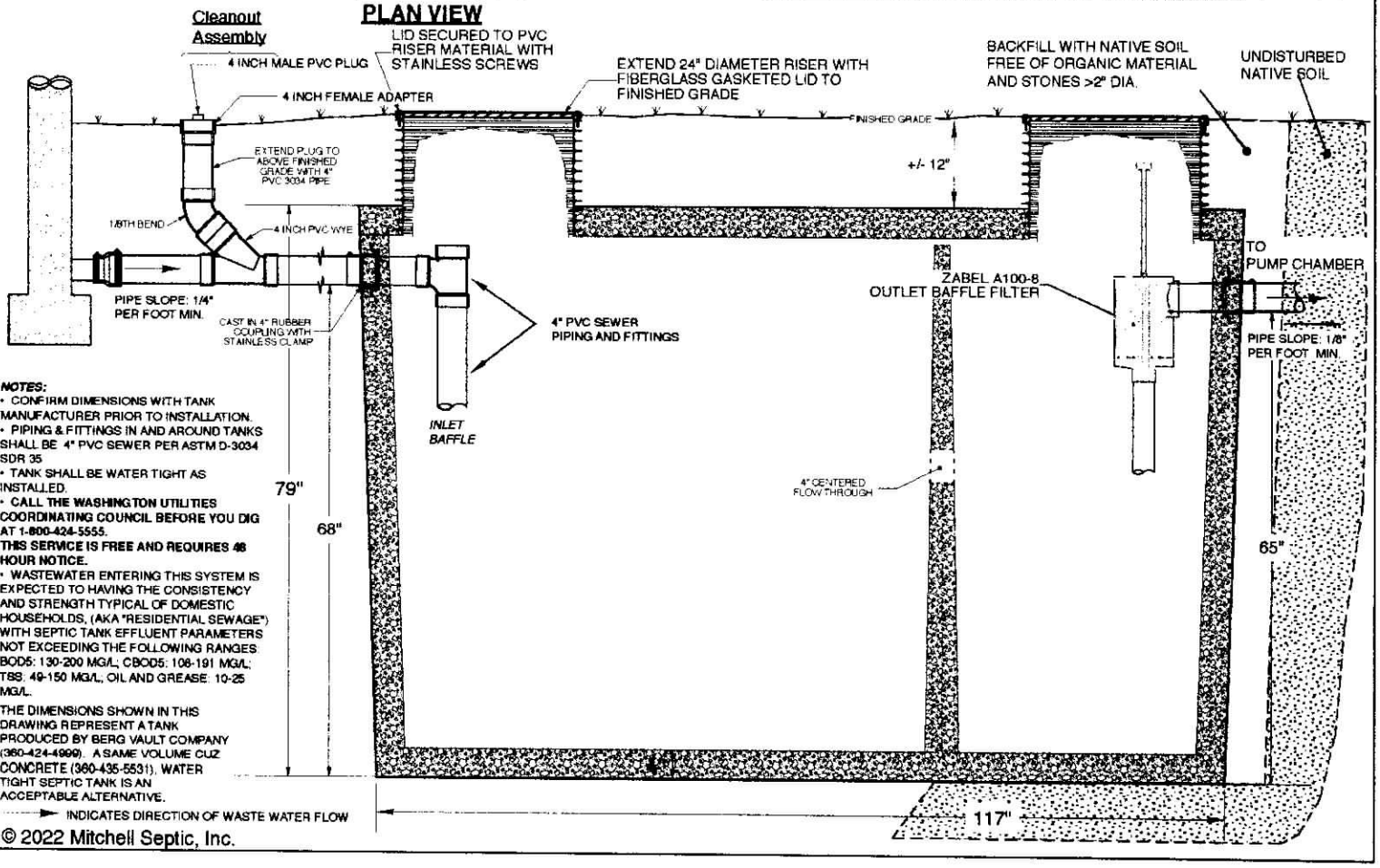
SCALE NTS SHEET NO. 9 OF 16

1750 GALLON PRE-CAST CONCRETE DOUBLE COMPARTMENT SEPTIC TANK

ON-SITE WASTEWATER TREATMENT SYSTEM
STATE OF WASHINGTON
51100137
David B. Mitchell
LICENSED DESIGNER
EXPIRES 03/18/2024



PLAN VIEW



NOTES:

- CONFIRM DIMENSIONS WITH TANK MANUFACTURER PRIOR TO INSTALLATION.
- PIPING & FITTINGS IN AND AROUND TANKS SHALL BE 4" PVC SEWER PER ASTM D-3034 SDR 35
- TANK SHALL BE WATER TIGHT AS INSTALLED.
- **CALL THE WASHINGTON UTILITIES COORDINATING COUNCIL BEFORE YOU DIG AT 1-800-424-5555. THIS SERVICE IS FREE AND REQUIRES 48 HOUR NOTICE.**
- WASTEWATER ENTERING THIS SYSTEM IS EXPECTED TO HAVING THE CONSISTENCY AND STRENGTH TYPICAL OF DOMESTIC HOUSEHOLDS, (AKA "RESIDENTIAL SEWAGE") WITH SEPTIC TANK EFFLUENT PARAMETERS NOT EXCEEDING THE FOLLOWING RANGES. BOD5: 130-200 MG/L; CBOD5: 108-191 MG/L; TSS: 49-150 MG/L; OIL AND GREASE: 10-25 MG/L.

THE DIMENSIONS SHOWN IN THIS DRAWING REPRESENT A TANK PRODUCED BY BERG VAULT COMPANY (360-424-4999). A SAME VOLUME CUZ CONCRETE (360-435-5531), WATER TIGHT SEPTIC TANK IS AN ACCEPTABLE ALTERNATIVE.

→ INDICATES DIRECTION OF WASTE WATER FLOW

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DRAWN BY DBM DATE Nov. 21, 2020
SCALE NTS SHEET NO. 10 OF 16

OPTION 1 -
Glendon BioFilter

Septic Tank Outlet Filter
Zabel Model A100-8™

***USE AT BOTH ADU AND MAIN RESIDENCE**

A100/300™-8" Series

A smaller version of the original ZABEL® Disc Dam Filter, the A100/300-8™ Series is becoming a popular choice for applications where increased effluent quality is desired.

A100-8™ Series

The A100-8 is ideal for single and multi-family residential applications or light commercial settings where increased flows or higher quality effluent are required. The A100-8 is sized to handle flow rates from 1200 to 2400 gpd and is available in three different lengths. Every A100-8 is housed in ZABEL's Versa-Case to provide ease of installation with features such as a dual hub that solvent welds to either 4" or 6" SCH 40 pipe, reducer built into the bottom of the case, and optional supplemental filtering slots on the outlet to prevent solids carryover during servicing.

1/16" Filtration *Available lengths 18", 26" & 32"*

Features	A100 Series
Filtration	1/16"
Gallons Per Day	1200 - 6000
Linear Feet of Filtration	78 - 338
SmartFilter Switch and Alarm	Available
Available Filter Dimensions	8x18, 8x26, 8x32 12x20, 12x28, 12x36
Disc Dam Technology	x
Extend & Lok Compatible	x
NSF Certification	x
Installed in Multiples for Larger Flows	x
Applications	
Residential	x
Residential Multi-Family	x
Commercial	x
Grease Traps	
High TSS Removal	x
Benefits	
Extends Life of Leaching Fields	x
Keeps Solids in Septic Tank	x

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PROPERTY ID# 00489700302900

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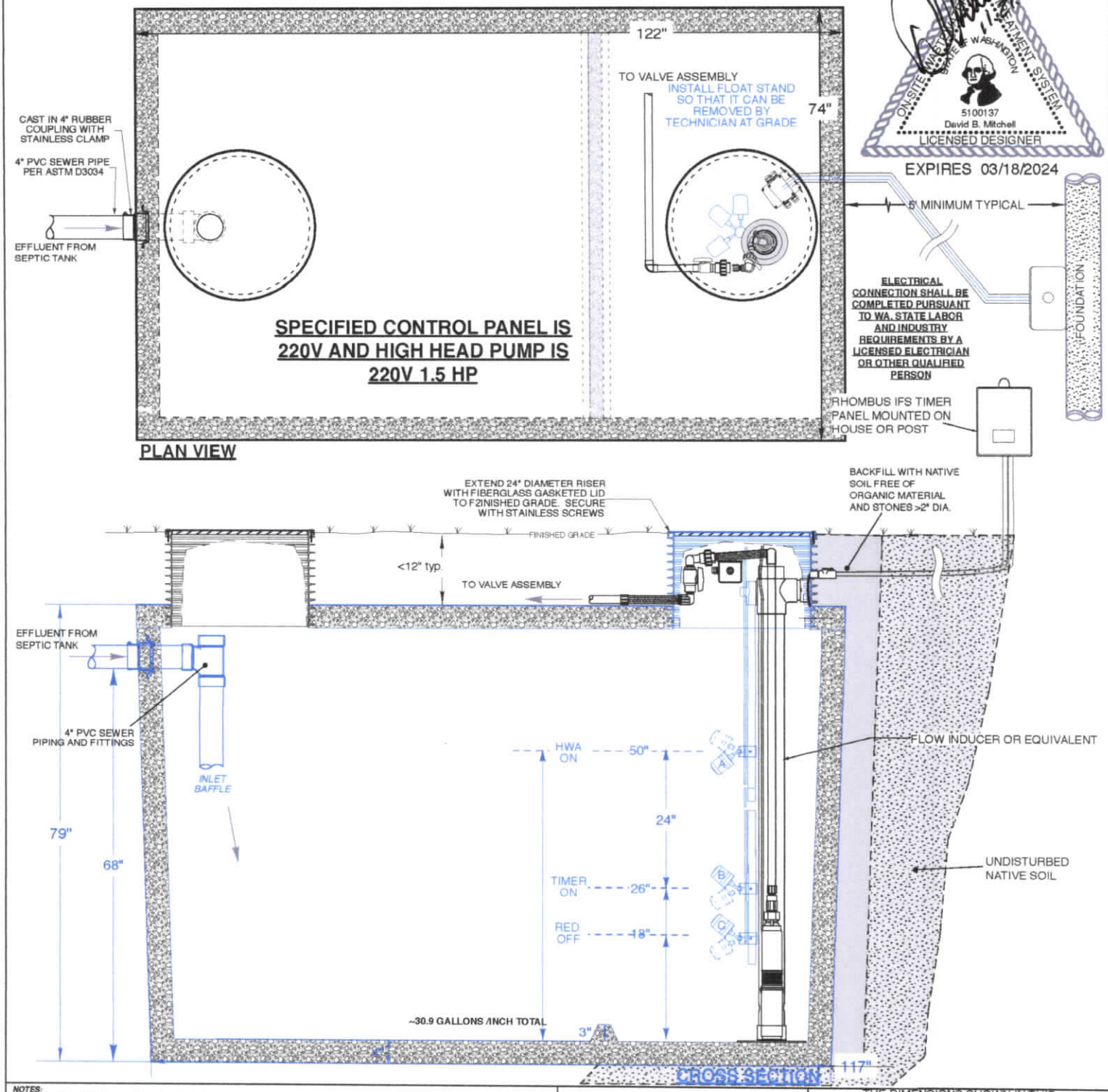
SCALE NTS SHEET NO. 11 OF 16

1750 Gallon Pre-cast Concrete Single Compartment Pump Chamber



ONSITE WASTEWATER TREATMENT SYSTEM
STATE OF WASHINGTON
5100137
David B. Mitchell
LICENSED DESIGNER
EXPIRES 03/18/2024

NOTES:

- CONFIRM DIMENSIONS WITH TANK MANUFACTURER PRIOR TO INSTALLATION.
- PIPING & FITTINGS IN AND AROUND TANKS SHALL BE 4" PVC SEWER PER ASTM D-3034 SDR 35
- TANK SHALL BE WATER TIGHT AS INSTALLED
- **CALL THE WASHINGTON UTILITIES COORDINATING COUNCIL BEFORE YOU DIG AT 1-800-424-5555.**

THIS SERVICE IS FREE AND REQUIRES 48 HOUR NOTICE.

- WASTEWATER ENTERING THIS SYSTEM IS EXPECTED TO HAVING THE CONSISTENCY AND STRENGTH TYPICAL OF DOMESTIC HOUSEHOLDS, (AKA "RESIDENTIAL SEWAGE") WITH SEPTIC TANK EFFLUENT PARAMETERS NOT EXCEEDING THE FOLLOWING RANGES: BOD5: 130-200 MG/L, CBOD5: 108-191 MG/L, TSS: 49-150 MG/L, OIL AND GREASE: 10-25 MG/L

→ DESIGNATES DIRECTION OF LIQUID WASTE FLOW

FLOAT A = HIGH WATER ALARM
FLOAT B = TIMER ON/OFF
FLOAT C = REDUNDANT OFF (OPTIONAL)

THE DIMENSIONS SHOWN IN THIS DRAWING REPRESENT A TANK PRODUCED BY BERG VAULT COMPANY (360-424-4999). A SAME VOLUME CUZ CONCRETE (360-435-5531), WATER TIGHT SEPTIC TANK IS AN ACCEPTABLE ALTERNATIVE.

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DRAWN BY DBM DATE Nov. 21, 2020
SCALE NTS SHEET NO. 12 OF 16

SPECIFICATIONS AND INSTALLATION INSTRUCTIONS FOR A 1750 GALLON PRE-CAST CONCRETE DOUBLE COMPARTMENT SEPTIC TANK

NOTE: The septic tank shall be water tight as installed.

1. **Obtain a permit:** A permit is required from the Snohomish Health District to install a septic tank. In addition to the permit, the Health District will require certain inspections during the construction process.
2. **Locate the tank:** The tank does not need to be placed in the exact location specified in the drawing. Generally tanks should be: a. downhill of the building and as close to ground level (i.e. shallow) as possible. 12" depth to the top of the tanks is preferred unless water table conditions suggest higher placement.
3. Verify the setbacks:

3.1 Stake out the septic tank area on the ground in the location shown on the site plan. Measure from the edge of the septic tank to the various site features having setback requirements. The installer be responsible for maintaining compliance with all local rules. Check the set backs. If the septic tank does not meet the set backs, then: a. STOP. b.) contact the Designer of Record or Health District Inspector before proceeding.

3.2. Washington Administrative Code 246-272A-0210 Table IV specifies minimum set backs to site features. The Health District may require greater set backs in which case they would take precedent.

4. **Regulatory requirements of the design:** The septic tank must be approved by the Health District.
5. **Details:** The dimensions shown in the drawing represent the tank produced by Berg Vault Company (360-424-4999). It is the Installer's responsibility to confirm tank dimensions with the manufacturer prior to installation.

5.1 The septic tank must be installed level plus minus 1/2 inch. If the septic tank is set so that the outlet is less than 1 inch below the inlet, then it is unacceptable and will have to be reset. 3" of sand or pea gravel bedding is required if large (>3") or sharp rocks are exposed at the bottom of the excavation.

5.2 The inlet pipe, outlet pipe and seam formed by the wall and lid of the tank should be grouted with Custom Plug Hydraulic Patching or equivalent to assure the water tightness of the tank.

5.3 A water test of the septic tank is required if the tank feeds a pump chamber containing a pump controlled by a timer panel.

6. **Piping:**

6.1. Exterior: 4" PVC, gasketed bell end per ASTM D-3034 SDR35.

6.2. Interior: 4" PVC sewer per ASTM D-2729.

6.3. Slope: from house connection to tank: minimum slope of 1/4" per foot.

7. **Clean out**: Between the house and the septic tank install a clean out using a 4" PVC sweep tee (a wye and 1/4 bend may be substituted). Terminate the inlet of the clean out at or above finished grade with a female adapter and a threaded plug. Grease the threads of the plug so it can be removed later. A clean out shall be installed up stream of any 90 degree bend or every 100 feet in a transmission line carrying untreated sewage. A detail of the clean out is shown on the tank drawing.
8. **Fittings:** inside the septic tank shall be glued in place.

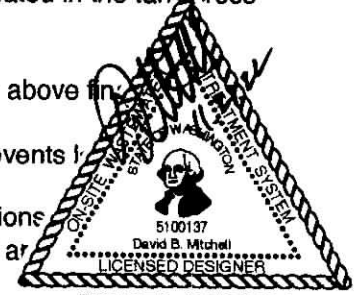
8.1 Install tees at the inlet and outlet and intercompartmental wall. Extend into the clarified zone, typically 40% of the liquid depth. All fittings must be 4" PVC sewer D-2729.

9. **Outlet baffle filter:** The outlet of the septic tank shall be fitted with a filter as indicated in the tank cross section.
10. **Risers:**

10.1 Risers are to be a minimum of 24 inches diameter and lids are to be at or above finished grade. Consult with the tank manufacturer about adjusting riser heights to final grade.

10.2 Risers shall attach risers to the top of the septic tank in a manner that prevents leakage between the riser and the top of the septic tank.

11. **Inspection:** It is the licensed installer's responsibility to determine which inspections are required by the regulatory authorities and the Designer of Record before installation. Inspections are required. By requesting inspections you are agreeing to pay for them.



EXPIRES 03/18/2024

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PROPERTY ID# 00489700302900
DRAWN BY DBM DATE rv Nov. 30, 2022
SCALE NTS SHEET NO. 13 OF 16

Pump Specification and Pressure Distribution and Timer Settings Calculations

· SPECIFIED CONTROL PANEL IS 220V AND HIGH HEAD PUMP IS 220V 1.5 HP

Parameters

Discharge Assembly Size	1.50	inches
Transport Length	440	feet
Transport Pipe Class	40	
Transport Line Size	1.50	inches
Distributing Valve Model	None	
Max Elevation Lift	73	feet
Manifold Length	20	feet
Manifold Pipe Class	40	
Manifold Pipe Size	1.25	inches
Number of Laterals per Cell	6	
Lateral Length	56	feet
Lateral Pipe Class	40	
Lateral Pipe Size	1.25	inches
Orifice Size	1/8	inches
Orifice Spacing	5	feet
Residual Head	5	feet
Flow Meter	None	inches
'Add-on' Friction Losses	0	feet

Calculations

Minimum Flow Rate per Orifice	0.43	gpm
Number of Orifices per Zone	72	
Total Flow Rate per Zone	31.2	gpm
Number of Laterals per Zone	6	
% Flow Differential 1st/Last Orifice	0.8	%
Transport Velocity	4.9	fps

Frictional Head Losses

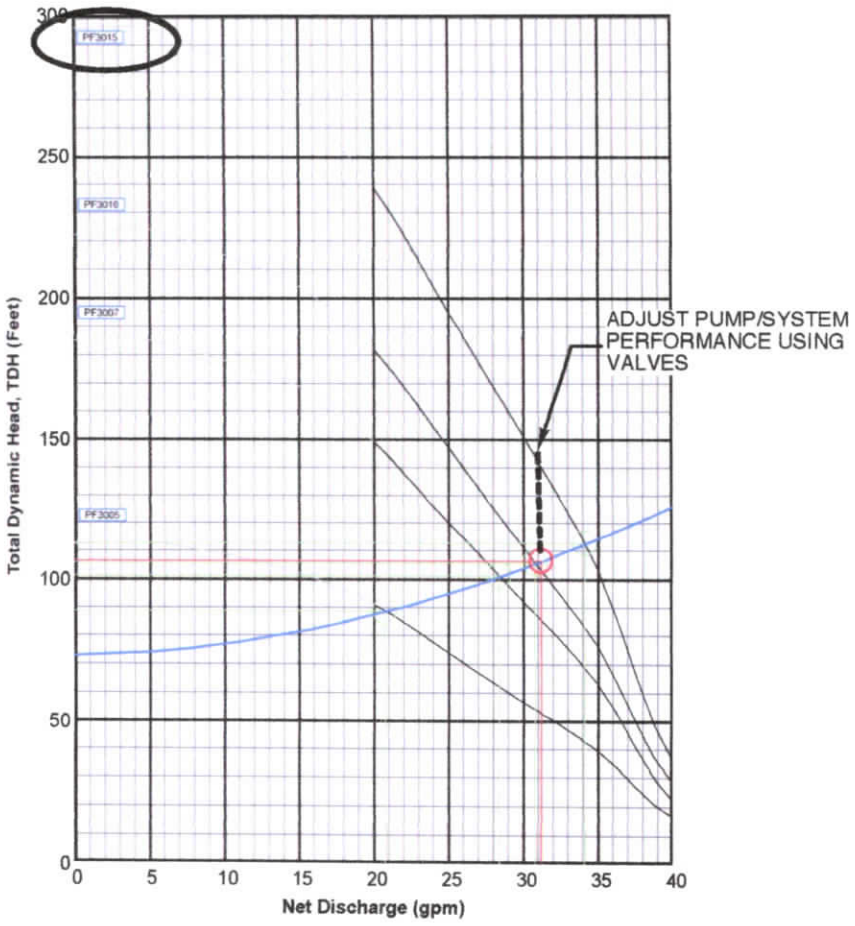
Loss through Discharge	2.9	feet
Loss in Transport	24.8	feet
Loss through Valve	0.0	feet
Loss in Manifold	0.7	feet
Loss in Laterals	0.1	feet
Loss through Flowmeter	0.0	feet
'Add-on' Friction Losses	0.0	feet

Pipe Volumes

Vol of Transport Line	46.5	gals
Vol of Manifold	1.6	gals
Vol of Laterals per Zone	26.1	gals
Total Volume	74.2	gals

Minimum Pump Requirements

Design Flow Rate	31.2	gpm
Total Dynamic Head	106.5	feet



PumpData

PF3005 High Head Effluent Pump
30 GPM, 1/2HP
115/230V 1Ø 60Hz, 200V 3Ø 60Hz

PF3007 High Head Effluent Pump
30 GPM, 3/4HP
230V 1Ø 60Hz, 200/460V 3Ø 60Hz

PF3010 High Head Effluent Pump
30 GPM, 1HP
230V 1Ø 60Hz, 200/460V 3Ø 60Hz

PF3015 High Head Effluent Pump
30 GPM, 1-1/2HP
230V 1Ø 60Hz, 200/230/460V 3Ø 60Hz

Legend

System Curve:
Pump Curve:
Pump Optimal Range:
Operating Point:
Design Point:

Theoretical Timer Settings

('normal' time regime)

assumed usage per day	600	gal/day
flow to drain field	31.2	gal/min
total minutes on to DF per day	19.3	min/day
on time	4.0	**minutes**
dose volume	125	gal
cycles / day	5	
off time	4.7 HR. (282 MINUTES)	

NOTE: set timer based on actual performance to drain field

PD calculations and curve source: Orenco Systems, Inc. PumpSelectTM v2.14 2009

ONSITE WASTEWATER TREATMENT SYSTEM
STATE OF WASHINGTON
5100137
David B. Mitchell
LICENSED DESIGNER
EXPIRES 03/18/2024

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PROPERTY ID# 00489700302900
DRAWN BY DBM DATE Nov. 21, 2022
SCALE NTS SHEET NO. 14 OF 16

Pump Chamber Electronics

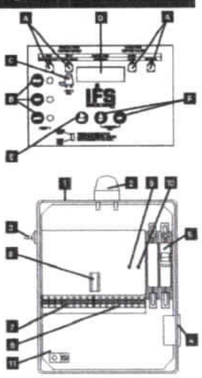
CONTROL PANEL: IFS11W914H4D8AC

INSTALLER FRIENDLY SERIES® - IFS Single Phase Simplex

Single phase, simplex demand dose or timed dose, float or C-Level™ controlled system for pump control and system monitoring.

The IFS simplex control panel is designed to control one 120, 208, 240 VAC single phase pump in water and sewage installations. The panel features an easy-to-use touch pad with display on the inner door for programming and system monitoring. The panel configuration can be easily converted in the field to either a timed dose or demand dose.

The optional C-Level™ sensor is a pressure transducer that senses the liquid level in the tank and sends a signal to the IFS panel. Pump activation levels can be adjusted by using the panel touch pad. C-Level™ CL40 sensor operating range is 3-39.9 inches (7.6-101.3 cm). C-Level™ CL100 operating range is 3-99.5 inches (7.6-252.7 cm).



Model Shown IFS11W114XBAC

Reg. U.S. Pat. & TM Off
C-Level™ Sensor US Patent No. [illegible]

TOUCH PAD FEATURES

A. **Level Status Indicators** illuminate when floats or set points are activated. Alarm will activate if a float operates out of sequence.
B. **HOA (Hand-Off-Automatic) Buttons** control pump mode with indication. Hand mode defaults to Automatic when stop level or redundant off level is reached.
C. **Pump Run Indicator** illuminates when pump is called to run.
D. **LED Display** shows system information including: levels in inches or centimeters (C-Level™ only), mode, pump elapsed time (hh:mm), events (cycles), alarm counter, float error count, timed dose override counter (timed dose only), and ON/OFF times (timed dose only).
E. **NEXT Push Button** toggles display.
F. **UP and SET Push Buttons** set pump ON/OFF times (timed dose only) or activation levels (C-Level™ only).

PANEL COMPONENTS

1. **Enclosure** measures 12x10x6 inches (30.48x24.4x15.24) NEMA 4X (ultraviolet stabilized thermoplastic, padlockable with integral mounting flanges, drip shield, (2) heavy duty cover latches, and stainless steel ¼ turn set screw; for outdoor or indoor use). Note: added options, voltage, and amp range selected may change enclosure size and enclosure features, and component layout.
2. **Red Alarm Beacon** provides 360° visual check of alarm condition.
3. **Exterior Alarm Test/Normal/Silence Switch** allows horn and light to be tested and horn to be silenced in an alarm condition. Alarm automatically resets once alarm condition is cleared.
4. **Alarm Horn** provides audio warning of alarm condition (83 to 85 decibel rating).
5. **Circuit Breaker** (optional) provides pump disconnect and branch circuit protection.
6. **Power Relay** controls pump by switching electrical lines. Definite purpose contactor used when pump full load amps are above 15.
7. **Float Connection Terminal Block**
8. **Incoming Control/Alarm Power & Pump Terminal Block**
9. **Control Power Indicator/Fuse** indicator light illuminates if control power is present in panel. Alarm will activate if control fuse is blown.
10. **Alarm Power Indicator/Fuse** indicator light illuminates if alarm power is present in panel.
11. **Ground Lug**

NOTE: Schematic/Wiring Diagram and Pump Specification Label are located inside the panel on enclosure cover.

FEATURES

- Entire control system is UL Listed to meet and/or exceed industry safety standards
- Dual safety certification for the United States and Canada
- Standard package includes:
  Demand Dose - three 20' control switches
  Timed Dose - two 20' control switches
- Available with EZconnex® float system
- Complete with step-by-step installation instructions
- Five-year limited warranty

c UL us LISTED

SJE RHOMBUS.
1-888-DIAL-SJE • 1-218-847-1317
1-218-847-4617 Fax
email: customerservice@sjeinc.com
www.sjerhombus.com 8.11

California Prop 65 requires the following: ⚠ WARNING Cancer and Reproductive Harm - www.P65Warnings.ca.gov
SEE REVERSE SIDE FOR ORDERING INFORMATION.
SEE PRICE BOOK FOR LIST PRICE.

CONTROL PANELS

IFS	1	1	W	1	1	4	H	4D 8AC

MODEL IFS

MODEL TYPE ☑
1 = SPLX TIMED DOSE (includes option 8AC standard)
2 = SPLX DEMAND DOSE

ALARM PACKAGE ☑
1 = alarm package (includes test/normal/silence switch, fuse, red light & horn)

ENCLOSURE RATING ☑
W = NEMA 4X

STARTING DEVICE ☑
1 = 120/208/240 VAC
9 = 120 VAC

PUMP FULL LOAD AMPS ☑
0 = 0-7 FLA
1 = 7-15 FLA
2 = 15-20 FLA

PUMP DISCONNECTS ☑
0 = no pump disconnect
4 = circuit breaker
120 VAC (must select starting device option 9)
120/208/240 VAC (must select starting device option 1)

SWITCH APPLICATIONS ☑
H = floats (Timed dose = low level and alarm / Demand dose = stop, start, and alarm)
X = no float
timed dose
demand Dose
Note: Pump down applications only.

OPTIONS *Listed below*

If additional features are required, call the factory for a quote on an Engineered Custom control panel.

	CODE	DESCRIPTION
☐	3A	Alarm flasher
☐	3B	Manual reset alarm
☐	4A	Redundant off *(select option 4D if floats are required)*
☑	4D	Redundant off float - 20 ft. Sensor Float®
☐	6A	Auxiliary alarm contacts, form C
☑	8AC	Display board includes: ETM counter, events (cycles) counter, alarm counter, and override counter (timed dose only). Display board also required for changing a demand dose panel to timed dose panel. Demand Dose; Timed Dose *(included as standard)*
☐	10E	Lockable latch - NEMA 4X
☐	10F	Lightning arrestor *(control and alarm power combined)*

	CODE	DESCRIPTION
☐	10K	Anti-condensation heater
☐	11C	NEMA 1 remote alarm panel *(must select option 6A)*
☐	11D	NEMA 4X remote alarm panel *(must select option 6A)*
☐	15A	Control / Alarm circuit breaker
☐	16A	10' cord in lieu of 20' *(per float)*
☐	16B	15' cord in lieu of 20' *(per float)*
☐	16C	30' cord in lieu of 20' *(per float)*
☐	16D	40' cord in lieu of 20' *(per float)*
☐	17C	Sensor Float® / internally weighted ▲ *(per float)*
☐	17D	Sensor Float® / externally weighted ▲ *(per float)*
☐	17G	MilliAmpMaster™ / pipe clamp ● *(per float)*
☐	17H	MilliAmpMaster™ / externally weighted ● *(per float)*
☐	18A	Timer override option with float (timed dose only)

● Mechanically-activated ▲ Mercury-activated

CONTROL PANEL: 240 VOLT RHOMBUS IFS11W114H8AC OR APPROVED BETTER. PANEL INCLUDES HIGH WATER ALARM, DOSE TIMING, EVENT COUNTER AND ELAPSED TIME METER.
· THEORETICAL TIMER SETTINGS ARE SHOWN ON ATTACHED PRESSURE DISTRIBUTION ANALYSIS
· ACTUAL SETTINGS ARE DETERMINED BY ON-SITE DRAWDOWN TEST NOT TO EXCEED DAILY DESIGN FLOW
· AVOID PLACEMENT OF PANEL ON EXTERIOR BEDROOM WALLS

EXPIRES 03/18/2024

High Head Effluent Pump
Model PF301512-20

Technical Data Sheet

PF Series High-Head Effluent Pumps

Applications

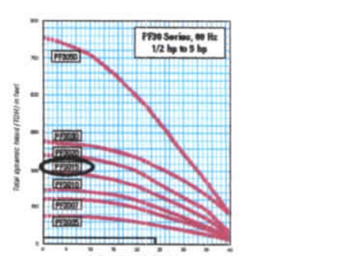
Our submersible High-Head Effluent Pumps are designed to transport screened effluent (with low TSS counts) from septic tanks or separate dosing tanks. All our pumps are constructed of lightweight, corrosion-resistant stainless steel and engineered plastics; all are field-serviceable and repairable with common tools; and all standard 60-Hz PF Series models are CSA certified to the U.S. and Canadian safety standards for effluent pumps, meeting UL requirements.

High-Head Effluent Pumps from Orenco® are used in a variety of applications, including pressurized drainfields, packed bed filters, mounds, aerobic units, effluent irrigation, effluent sewers, wetlands, lagoons, and more. These pumps are designed to be used with a Biotube® pump vault.

Features/Specifications

To specify this pump for your installation, require the following:
- Minimum 24-hour run-dry capability with no deterioration in pump life or performance*
- 1/8-inch (3-mm) bypass orifice (patent pending) to ensure flow recirculation for motor cooling and to prevent air bind
- Liquid end repair kits available for better long-term cost of ownership
- TRI-SEAL™ floating impeller design on 10-, 20-, and 30-gpm models; floating stack design on 50- and 75-gpm models
- Super stainless Franklin Electric motor, rated for continuous use and frequent cycling
- Type SOOW 600-V motor cable (suitable for Class I, Division 1 and Division 2 applications)
- Two-year warranty from date of manufacture against defects in materials or workmanship

** Not applicable for 5-hp models*



Standard Models

See specifications chart, pages 2-3, for a list of standard pumps. For a complete list of available pumps, call Orenco.

Nomenclature

PF [ ] [ ] [ ] [ ]-[ ]

Cord length: Blank – 10'; 20* – 20'; 30 – 30'; 50 – 50'
Voltage (nameplate): 1 – 115 (1/2 hp only); 200 – 200; 2 – 230 (220 @ 50 Hz); 4 – 460
Frequency: 1 – single-phase 60 Hz; 3 – three-phase 60 Hz; 5 – single-phase 50 Hz
Horsepower: 05 – 1/2 hp; 07 – 3/4 hp; 10 – 1 hp; 15 – 1-1/2 hp; 20 – 2 hp; 30 – 3 hp; 50 – 5 hp
Nominal flow (gpm): 10; 20; 30; 50; 75
Pump (PF Series)

* [illegible]

NTD-PU-PF-1
Rev. [illegible]

PF Series High-Head Effluent Pumps (continued)

Specifications

60 Hz Model														
[illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SPECIFIED CONTROL PANEL IS 220V
HIGH HEAD PUMP IS 220V 1.5 HP

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PROPERTY ID# 00489700302900

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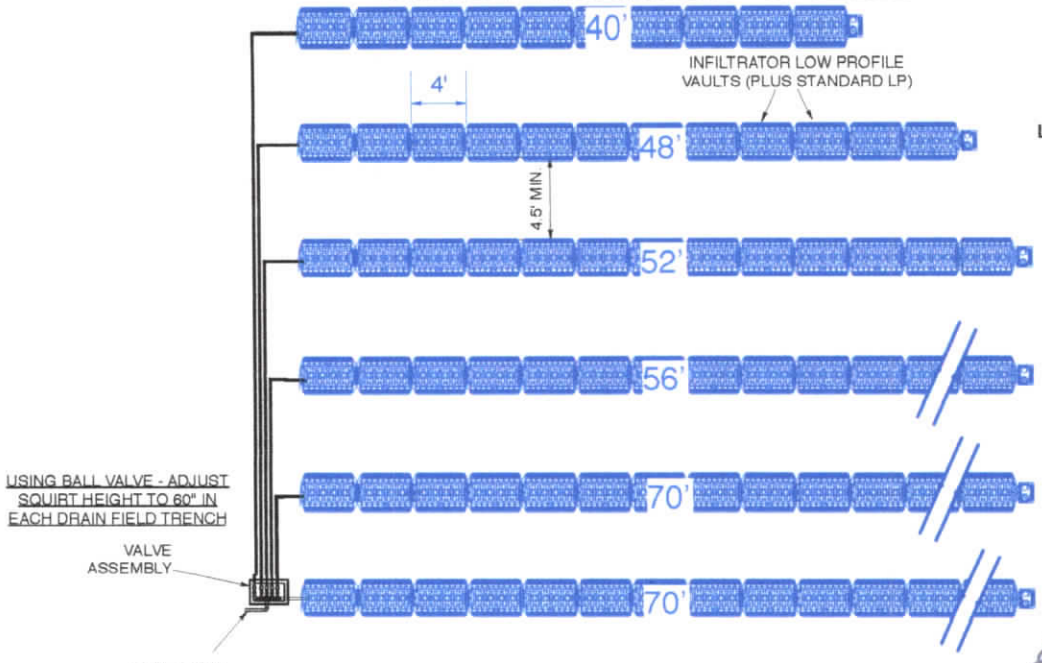
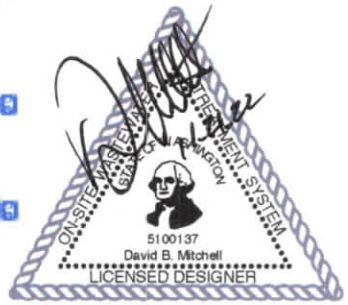
SCALE NTS SHEET NO. 15 OF 16

LPD DRAIN FIELD USING INFILTRATOR LP GRAVEL-LESS VAULTS - STYLIZED



Chamber Plan View
n.t.s.

LENGTH ROUNDED TO NEAREST 4 FEET

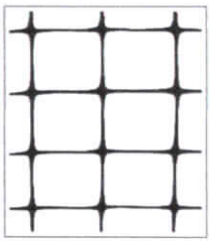


EXPIRES 03/18/2024

- INFILTRATOR LOW PROFILE VAULTS (PLUS STANDARD LP)
- ORIFICE SPACING PER ATTACHED SHEETS

TENAX Cintoflex E

Bi-oriented Net



AVAILABLE ROLL DIMENSIONS AND WEIGHT

ENGLISH		METRIC	
Dimensions	Weight	Dimensions	Weight
3.3' x 330.0'	18.74 lbs	1.0m x 100.0m	8.5 kg
4.0' x 330.0'	22.70 lbs	1.2m x 100.0m	10.3 kg
6.5' x 330.0'	38.14 lbs	2.0m x 100.0m	17.3 kg

PHYSICAL CHARACTERISTICS		NOTES
POLYMER TYPE	Polypropylene	
STRUCTURE	Quadrangular	
COLOR	Black	
PACKAGING	Rolls in Clear Bags with Label	

DIMENSIONAL CHARACTERISTICS	ENGLISH		METRIC		NOTES
	UNIT		UNIT		
MD PITCH	in	0.51	mm	13.0	a
TD PITCH	in	0.59	mm	15.0	b

TECHNICAL CHARACTERISTICS	ENGLISH		METRIC		NOTES
	UNIT		UNIT		
MD TENSILE STRENGTH	lbs / ft	308	kN/m	4.5	a
MD ELONGATION	%	15	%	15.0	a
TD TENSILE STRENGTH	lbs / ft	411	kN/m	6.0	b
TD ELONGATION	%	10	%	10	b

NOTES:
a Longitudinal direction
b Transversal direction

Barrier - place on bottom of trench excavation prior to placing gravell-less vault. Extend/wrap excess material around sides of vault

TANEX Cintoflex E
Available at
BERG VAULT 360-424-4999

INFILTRATOR systems inc.

Quick4 Plus

The Quick4® Plus Standard Low Profile (LP) Chamber

Quick4 Plus™ Series

The Quick4 Plus Standard Low Profile (LP) offers maximum strength through its four center structural columns. This chamber can be installed in a 36-inch-wide trench. It is shorter in height than Infiltrator's other Standard model chambers, allowing for shallower installation. Like the original line of Quick4 chambers, it offers advanced contouring capability with its Contour Swivel Connection™, which permits turns up to 15°, right or left. The Quick4 Plus All-in-One 8 and Quick4 Plus Endcaps provide increased flexibility in system design and configurations.

Maximum Strength

Quick4 Plus Standard LP Chamber Specifications

Size	34"W x 53"L x 8"H (864 mm x 1346 mm x 203 mm)
Effective Length	48" (1219 mm)
Louver Height	6.3" (160 mm)
Storage Capacity	32 gal (121 L)
Invert Height	3.3" (84 mm), 9.6" (244 mm)

Quick4 Plus Standard Low Profile (LP) Chamber Benefits:

- Low profile design makes this chamber ideal for shallow applications
- Reduces imported fill needed for cap and fill systems
- Four center structural columns offer superior strength
- Advanced contouring connections
- Latching mechanism allows for quick installation
- Four-foot chamber lengths are easy to handle and install
- Supports wheel loads of 16,000 lbs/axle with 12" of cover

Quick4 Plus All-in-One Periscope Benefits:

- Allows for raised invert installations
- 180° directional inleting
- 12" raised invert is ideal for serial applications

Quick4 Plus All-in-One 8 Endcap Benefits:

- May be used at the end of chamber row for an inlet/outlet or can be installed mid-trench
- Mid-trench connection feature allows center feed inleting of chamber rows
- Center-feed connection allows for easy installation of serial distribution systems
- Variable pipe connection options allow for side, end or top inleting
- Piping drill points are set for gravity or pressure pipe

Quick4 Plus Endcap Benefits:

- Simple, flat design
- Allows installation of a pipe from the end only
- Piping drill points are set for gravity or pressure pipe

Certified by the International Association of Plumbing and Mechanical Officials (IAPMO)

APPROVED in _____

Mitchell Septic, Inc.

David Mitchell
Licensed Designer
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Mount Vernon, WA 98274
(360) 421-3600
fax (360) 445-4311
david@mitchellseptic.com

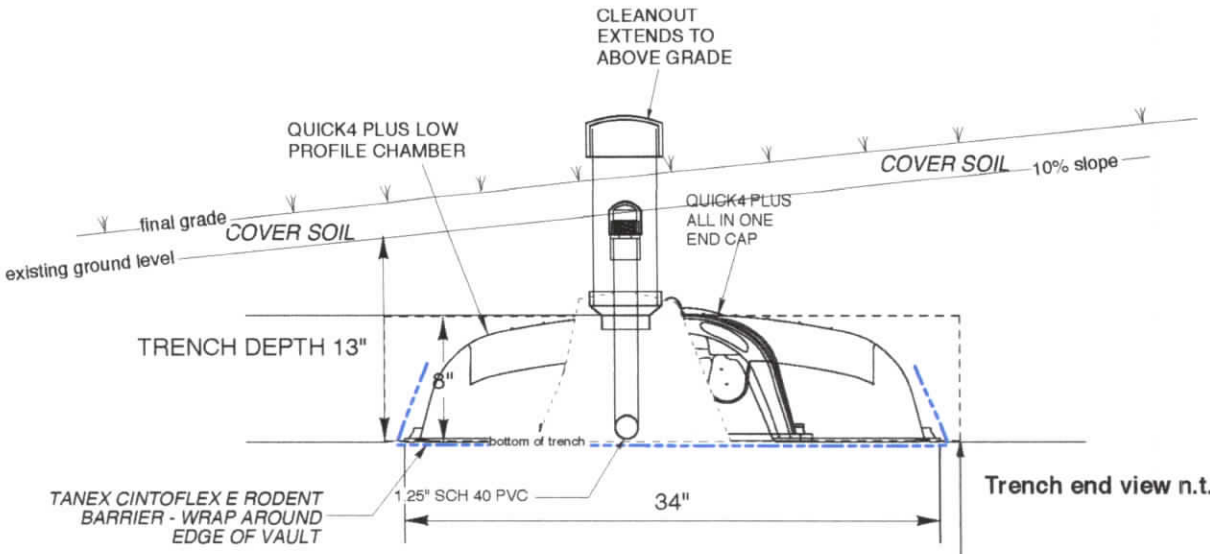
CLIENT NAME/JOB # Harris / 220127

PROPERTY ID# 00489700302900

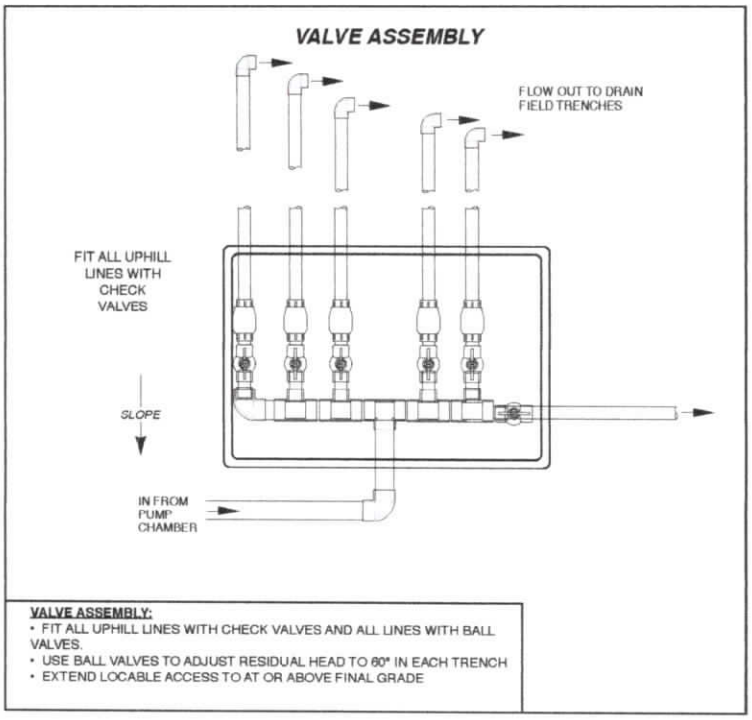
DRAWN BY DBM DATE Nov. 21, 2022

SCALE NTS SHEET NO. 16 OF 16

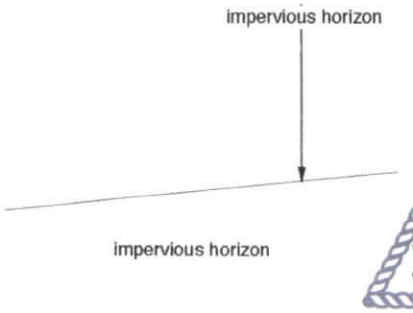
Quick4 Plus Standard Low Profile (LP) Chamber

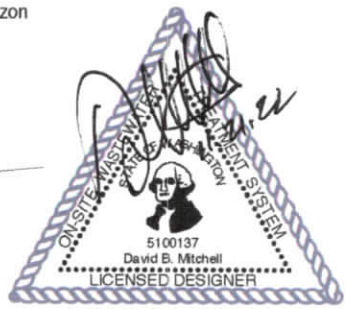


Trench end view n.t.s.

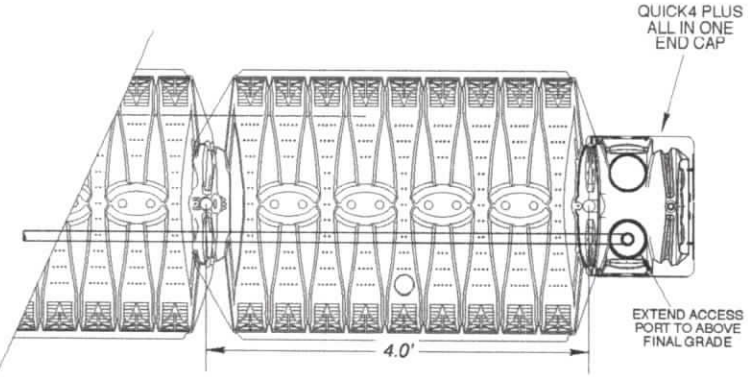


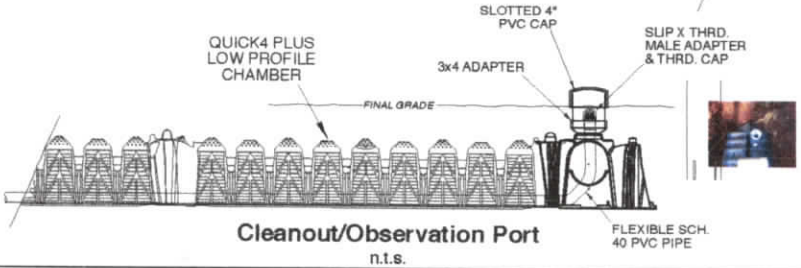
VALVE ASSEMBLY:
- FIT ALL UPHILL LINES WITH CHECK VALVES AND ALL LINES WITH BALL VALVES.
- USE BALL VALVES TO ADJUST RESIDUAL HEAD TO 60" IN EACH TRENCH
- EXTEND LOCABLE ACCESS TO AT OR ABOVE FINAL GRADE





EXPIRES 03/18/2024





Cleanout/Observation Port
n.t.s.

Chamber Details
NTS