

# PRELIMINARY FEASIBILITY STUDY FOR AN ON-SITE WASTEWATER SYSTEM

UNDER CANVAS  
COLUMBIA RIVER GORGE SITE

A PROPOSED CAMPGROUND  
IN KLICKITAT COUNTY WA

**REPORT DATE**

May 21, 2020

**SUBJECT PARCELS**

Southern half of parcels  
04101200002100 and 04101200002101  
Klickitat County, WA

**PREPARED FOR**

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## **BACKGROUND AND GENERAL PROJECT INFORMATION**

EVER GREEN SEPTIC DESIGN, INC. (EGSD) was asked to provide a preliminary on-site wastewater system (septic) feasibility study for a proposed tent camping project. The project will include approximately 95 camping tents as well as restroom, kitchen and laundry facilities. The purpose of this study is to determine initial feasibility of liquid waste treatment and disposal on this property and narrow down the options and permit requirements for the next steps forward.

### **PUBLIC SEWER AVAILABILITY**

Currently, there are no public utilities servicing the property. Based on our research, public sewer is not available. Liquid waste generated by the project will need to be treated and disposed on site.

### **PERMITTING AGENCY**

All on-site wastewater systems must obtain an installation permit from the Local Health Jurisdiction (LHJ), State Department of Health (DOH) or State Department of Ecology (DOE). Larger systems must also maintain an operating permit.

Systems less than 3,500 gallons per day are permitted by the LHJ. Systems between 3,500 gallons per day and 100,000 gallons per day are permitted by DOH. These are considered “Large Onsite Sewage Systems” (LOSS). Systems over 100,000 gallons per day are permitted by DOE.

### **PRELIMINARY LIQUID WASTEWATER FLOWS AND CONSIDERATIONS**

Determining the anticipated volume of sewage generated by a project is important in order to size the system appropriately. The number of gallons a system is sized at also determines the review/permit agency.

On-site wastewater system design flows are typically based on liquid waste design flow charts from the US Environmental Protection Agency (USEPA), DOH or DOE (typically referred to as “book numbers”). These sources list typical flows from various project uses. Not all uses are listed and sometimes a project doesn’t fit the categories available. The data in these manuals is typically outdated and can be somewhat conservative. In lieu of utilizing the manuals, a study can be completed from three similar facilities to determine a reasonable project design flow.

While a study of three similar facilities could be completed, it is outside the scope of this phase of the project. Based on the “book numbers”, the proposed project could fall into the following categories:

USEPA Developed Campground	30 gallons/person/day
USEPA Luxury Camp with Private Bath	90 gallons/person/day
DOH Campground with full amenities	100 gallons/campsite/day
DOE Luxury Campground	100 gallons/campsite/day

Utilizing an assumed occupancy rate of 2.5 persons per site and utilizing the above numbers, an estimated liquid waste generation per site would be anywhere between 75 and 225 gallons per day. For the purposes of this report, we'll assume 100 gallons/site/day.

**Assuming 95 campsites, the anticipated total liquid waste generation from this property is approximately 9,500 gallons per day.** If this was divided into one or two wastewater systems, permitting through the State DOH would be required. If three or more systems designed, permitting would be completed by the local Health Jurisdiction (Klickitat County).

## **SITE VISIT AND PRELIMINARY SOIL EVALUATION**

On May 19, 2020, EGSD completed a site visit. The work included: digging and backfilling test holes with an excavator, soil analysis and other site reconnaissance. A total of 5 holes were excavated and evaluated. See attached figure for a graphical representation of the test hole locations. Enough holes were evaluated to get a snapshot of the soil, but additional test holes and a more thorough analysis will be required at the design and permitting stage.

For purposes of septic system permitting, the soil profile is typically evaluated down to five or six feet deep. The soil is evaluated for its texture (percentage of sand, silt and clay), presence of a "restrictive" layer (seasonal water table) and other criteria. The soil is then categorized by its texture on a 1-7 numbering system.

Type 1 is extremely gravelly soil and type 7 is clay. Type 7 soil is unsuitable for permitting any type or size of wastewater system. Systems over 1,000 gallons per day can only be permitted in soil types 1-5. Systems under 1,000 gallons per day can be located in type 6 soil.

At test locations 1, 2 and 3, the soils are between types 5 and 6. In this case, the soil "structure" will determine which category these soils fall into. "Structure" is not something a laboratory test can determine. Field observations are used to make this determination, and the evaluation has some subjectivity. Further evaluation and concurrence from the review agency will be required before making a final determination on this soil type. The loading rate for this soil will either be 0.2 or 0.4 gallons/square foot/day.

At test locations 4 and 5, the soil had a significantly better "structure" and texture and falls into type 4 soil. This soil type is ideal for permitting wastewater systems. The loading rate for this soil is 0.6 gallons/square foot/day.

At all tested locations, the depth to restrictive layer (seasonal water table) is greater than five feet from the surface.

Some areas of the property were observed to have slopes over 40%. This is typically a trigger for a setback or further geotechnical evaluation. The septic code requires that all components be placed on soil which is "stable". Further evaluation for slope setbacks will be required.

**It appears the soil on this property is suitable for permitting on-site wastewater system(s). If the system(s) is/are located over any soil categorized as type 6, they would be limited to 1,000 gallons per day. Further evaluation of site slopes will be required to ensure stability.**

## VERTICAL SEPARATION REQUIREMENTS

“Vertical separation” refers to the distance to the seasonal water table from the bottom of the drainfield surface. The septic code requires different vertical separations depending on the type and size of system being permitted.

**With greater than five feet of suitable soil to the seasonal water table, vertical separation will not be a concern with this project.**

## HORIZONTAL SEPERATION REQUIREMENTS

“Horizontal separation” refers to the distance from future septic system components to any well, surface water, spring, water supply pipe, or other item requiring a setback. Typically, a 100-foot setback is required from these features. Several creeks, gulley’s that likely carry seasonal water and a pond were observed. A 100-foot setback will be required from many of these features as well as from any future water well(s). A 10-foot setback will be required from future water pipes. Stormwater facilities may also require a setback.

Based on our site observations and the site plan provided, some areas of the property exceed 40% slope. A setback from steeper slopes may be required. We recommend that a geotechnical engineer evaluate proposed drainfield locations for slope stability and potential impacts.

**With appropriate considerations during design of the project, it appears horizontal setbacks can be met.**

## LAND AREA REQUIREMENTS

### MINIMUM PARCEL SIZE BASED ON ANTICIPATED SEWAGE FLOW

County Permitted Systems (systems under 3,500 gal/day) – The maximum sewage loading is based on the parcel’s soil type and the water source. It is assumed this development will be served by a Group A Public Well. Using the most conservative soil type observed, the code would require at least 22,000 square feet of land area per “unit volume” of sewage (450 gallons). With a 123 acre property, the property could be permitted to serve up to 109,000 gallons of liquid waste per day.

**It appears this requirement can easily be met if permitting is completed through the local County.**

LOSS Systems (systems greater than 3,500 gal/day) – The maximum liquid waste per acre per day is limited to 1,575 gallons for the soil types found on these parcels. With this information we can calculate:

$$123 \text{ acres} \times 1,575 \text{ gallons/day/acre} = 193,000 \text{ gallons/day}$$

**It appears this requirement can easily be met if a LOSS permit is pursued.**

## **LAND AREA REQUIRED FOR DRAINFIELD BASED ON ANTICIPATED SEWAGE FLOW**

Based on the anticipated sewage flow and the soil “perc” rate, we can calculate the area a drainfield would require. For this initial feasibility stage, we’ll calculate this area based on a per campsite basis.

Assuming 100 gallons/day/campsite, a soil infiltration rate of 0.2 gallons/square foot/day (lowest rate observed on site), standard drainfield technology and drainfield laterals at eight feet on center, each campsite would require approximately 2,700 square feet of land area for drainfield (the infiltrative surface itself would be less).

Assuming 100 gallons/day/campsite, a soil infiltration rate of 0.6 gallons/square foot/day (highest rate observed on site), standard drainfield technology and drainfield laterals at eight feet on center, each campsite would require approximately 900 square feet of land area for drainfield (the infiltrative surface itself would be less).

NOTE: These numbers do not include area for the tanks or setbacks from property lines, water, wells, etc. Actual area required will vary and could be more depending on the topography. Alternative drainfield types could also be utilized which have extra construction and maintenance costs, but allow for a smaller footprint.

## **STATE vs. COUNTY PERMITTING**

In Washington State, Counties permit wastewater systems below 3,500 gallons per day. Over 3,500, a State (LOSS) permit is required. State permits are more difficult and time consuming to obtain. In addition, State permits are divided into systems between 3,500 – 14,500 gal/day and over 14,500. Permits for over 14,500 gal/day are even more difficult than those below this threshold. For all systems over 1,000 gallons per day (no matter the review agency), they must be placed in soil types 1-5 and require pressure distribution. Simple gravity systems are not allowed.

It appears the overall liquid waste generated by the development will exceed the threshold for a State (LOSS) permit, but multiple smaller systems could be designed in order to allow permitting through the local County. Any systems kept below 1,000 gallons per day could be designed as simple gravity systems.

**Based on the dispersed nature of the design, site topography and complexity involved with obtaining a State LOSS permit, multiple wastewater systems are recommended.**

NOTE: With either permitting agency, the soil in the drainfield area(s) must remain undisturbed.

## **OTHER CONSTRAINTS**

There is a potential that other/unknown environmental or similar constraints may exist on this property. Septic systems are typically subject to setbacks from these features (wetlands, habitat, archeological, geohazard, other areas of special concern, etc). EGSD recommends having these items evaluated.

## SUMMARY

Based on our site evaluation and research, it appears this property will support onsite wastewater system(s) for the proposed development.

100 gallons per campsite should be used for planning purposes. This correlates to 900 – 2,700 square feet of land area required for drainfield for each tent. Further evaluation will be required to narrow this down. Because of the large range in design flow numbers from the design manuals and the fact they are typically conservative, EGSD recommends reviewing three similar facilities to help narrow this number down.

The south portions of the property have a more finely textured soil type and will require larger drainfield areas to accommodate the same liquid waste flows compared to the soil further north on the property. However- these southern soils are downhill from all of the proposed development and would permit simple gravity flow systems, but only if the systems are kept under 1,000 gallons per day. Further evaluation and cost analysis will be needed to determine the best path forward, but based on current information, EGSD is recommending designing multiple systems which are less than 3,500 gallons per day.

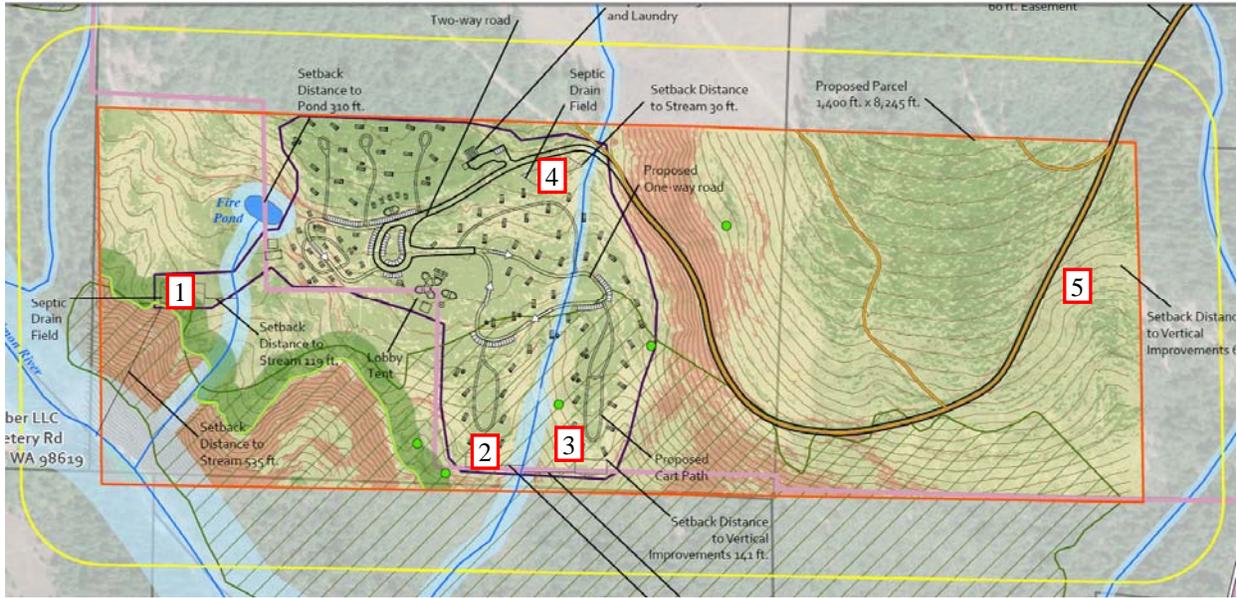
## NEXT STEPS

Recommended next steps as follows:

- If the client is aware of three similar facilities, obtain water usage records to narrow down project design flows.
- If not already completed, conduct a geohazard assessment of the property to determine if any areas of the property are less stable and may necessitate a setback from wastewater system components.
- Move into preliminary design followed by final design and permitting.

NOTE: THIS REPORT IS BASED ON PRELIMINARY INFORMATION PROVIDED BY THE CLIENT, INITIAL/PRELIMINARY FIELD DATA COLLECTED BY EGSD AND A CURSORY REVIEW OF THE CODES BELIEVED TO PERTAIN TO THE PROPOSAL. ALTHOUGH WE BELIEVE THE MOST IMPORTANT ASPECTS OF SEPTIC FEASIBILITY HAVE BEEN CONSIDERED, OTHER FACTORS MAY BE DISCOVERED WITH FUTURE ANALYSIS, APPLICATIONS AND REVIEW.

# FIGURE 1



Approximate Test Pit Locations