United States Department of the Interior

NATIONAL PARK SERVICE
240 W. 5th Avenue
Anchorage, Alaska 99501

IN REPLY REFER TO:

D5039(AKRO-EPD)

April 13th, 2016

Geoff Hill
Toilet Tech Solutions
17314 2nd Ave NW
Shoreline, WA, 98177

Re: Description of drainfield approval process for Bartlett Cove Campground Vermicomposting Toilet and Urine Disposal System, Glacier Bay National Park and Preserve

Dear Mr. Hill:

On April 7th, 2014, Robert Kimble of the Alaska Department of Environmental Conservation (ADEC) approved a submittal to install a drainfield to dispose of urine from a vermicomposting toilet that utilized the Toilet Tech Solutions urine diversion system in a campground in Glacier Bay National Park and Preserve. Following are some notes on my design submittal:

1. I did not propose the installation of a septic tank on the system, as this urine diversion system is effective at filtering out all solids prior to discharge in the drainfield.

2. I greatly oversized the drainfield design, as compared to calculating the infiltrative area on a conventional septic system, as there are no design guidelines for sizing a drainfield that receives undiluted urine. My design strategy was to spread the small volume of urine over a larger area, so that the urine would not enter the groundwater at essentially one concentrated point. For this system, I calculated a urine loading of 1.1 gallon per day. The drainfield was installed with an infiltrative area of 30 square feet, so the loading on this drainfield was .037 gpd/sf. The allowable application rate for a conventional drainfield in poorly graded sands (the existing soils at the site) would be 1.0 gpd/sf. Rather than sizing the drainfield by application rate, I designed it to spread the urine over a 20 lineal foot width.

3. ADEC requires a 4 foot minimum vertical separation from the bottom of a drainfield and groundwater and a 6 foot separation from an impermeable surface such as bedrock or clay. I was able to compare this site with a nearby site where several monitoring wells were installed, to approximate the depth to groundwater and to demonstrate that no impermeable surfaces existed within 6 feet of the bottom of the proposed drainfield. In addition, ADEC requires a minimum horizontal separation of 100 feet between a drainfield and the mean higher high water level of coastal waters and any other body of water. There was ample horizontal separation between the

proposed drainfield location and the mean higher high water level of Bartlett Cove to meet this criteria.

4. Even though ADEC only requires a nitrates analysis for systems with design loadings of 2,500 gallons per day of domestic wastewater effluent, another regulator at ADEC expressed great concern about the concentration of nitrates reaching the groundwater from this system. To address this issue, I prepared a mass balance calculation to determine the dilution of nitrates in the receiving groundwater. This analysis considers the concentration of nitrates in urine and the background concentrations in groundwater and considers the dilution due to surface water infiltration as well as existing groundwater flow. My calculation suggested that this drainfield would have a negligible effect on the concentration of nitrates in the groundwater at the site.

If you have any questions about this letter, please feel free to contact me by telephone at (907)644-3384 or email at bill_heubner@nps.gov

Sincerely,

William F. Heubner, Civil Engineer