



November 27, 2023

Altitude Custom Builders
Nate Reynolds
P.O. Box 88013
Steamboat Springs, CO 80488

Job Number: 20-12006

Subject: On-Site Wastewater Treatment
System Observations, Blandford Residence
and Caretaker Unit, Homestead B8,
Marabou Subdivision, Filing 1, Routt
County, Colorado.

Nate,

As requested, NWCC, Inc. (NWCC) visited the project site on November 11, 22 and December 22, 2021 and September 12 and October 2, 2023 to observe the On-site Wastewater Treatment System (OWTS) being installed for the Blandford Residence and Caretaker Unit under construction within Homestead B8 in Filing 1 of the Marabou Subdivision in Routt County, Colorado. NWCC previously designed the OWTS under this job number, dated March 2, 2021.

On November 9, 2021, NWCC discussed the OWTS with Mike Weber of Peak Excavating (Peak). Peak advised us that a dosing system would not be used for the OWTS. Based on our calculations, using the minimum soil treatment area of 1,650 square feet with factors of 1.0 for a dosed trench and 0.7 for chambers, a minimum adjusted soil treatment area of 1,155 square feet will be required. Using 12 sf/chamber for Quick-4 Standard Infiltrator chambers, a minimum of 97 chambers will be required if a dosing system is not used in the system. We recommended that the system be constructed with 3 runs of 24 chambers and 1 run of 25 chambers.

Site Observations: At the time of our site visit on November 11, 2021, the installer, Peak, had placed a plastic distribution box near the Soil Treatment Area (STA). The installer had also placed the 4-inch piping (ASTM 3034: SDR 35) from the distribution box to each run of chambers. The piping appeared to meet the minimum grade requirements. Flow levelers had been installed in each of the outlet pipes in the distribution box.

The installer had completed four runs of Quick-4 Standard Infiltrator chambers. The installer had placed 3 runs of 24 chambers and 1 run of 25 chambers for a total of 97 Quick-4 Standard Infiltrator chambers. Each run of chambers had been installed level in the upper 2 to 12 inches of

natural topsoil and organic materials. Galvanized mesh had been installed under and up the sides of the chambers. The installer had also placed inspection pipes at the inlet and terminal end of each run of chambers.

At the time of our site visit on November 22, 2021, the installer had placed a 1,250 gallon - two compartment concrete septic tank approximately 50 feet to the west of the residence, which was under construction. The installer had also placed the 4-inch solid sewer piping (ASTM 3034: SDR35) from the residence to the inlet of the septic tank and from the outlet of the septic tank to the distribution box. The 4-inch solid piping appeared to meet the minimum grade requirement. A cleanout was installed where the piping exited the residence. The inlet and outlet 'T' connections to the septic tank visually appeared to be properly constructed. An effluent filter had been placed in the outlet 'T' connection in the second chamber of the septic tank.

We advised the installer that they should backfill the piping, tank and chambers in accordance with the manufacturer's recommendations. We also advised them that a minimum of 18 inches and a maximum of 36 inches of soil cover should be placed over the tops and sides of the chambers. If sufficient amounts of fill are not placed over the chambers, seepage may occur during high usage periods. We also recommended a minimum of 24 inches of soil cover over the distribution lines, after the piping was properly bedded and a minimum of 12 inches of soil cover over the septic tank. The disturbed areas should be heavily seeded with a drought tolerant grass.

At the time of our site visit on December 22, 2021, the installer had completed backfilling the STA and the septic tank for the residence. Risers had been installed on the septic tank access and the lids were accessible above the finished ground surface. It appeared that sufficient cover had been placed over the piping, septic tank and chambers. A 4-inch diameter PVC Y connection had been installed below/downstream of the outlet of the residence septic tank for the caretaker residence.

At the time of our site visit on September 12, 2023, the installer had placed a 1,000 gallon - two compartment concrete septic tank approximately 30 feet to the west of the caretaker unit, which was under construction. The installer had also placed the 4-inch solid sewer piping (ASTM 3034: SDR35) from the caretaker unit to the inlet of the septic tank and from the outlet of the septic tank to the connection to the distribution box, located northwest of the residence septic tank.

The 4-inch solid piping between the caretaker residence and the septic tank appeared to meet the minimum grade requirement. A cleanout was installed where the piping exited the residence. The inlet and outlet 'T' connections to the septic tank visually appeared to be properly constructed. An effluent filter had been placed in the outlet 'T' connection in the second chamber of the septic tank. The piping from the outlet of the caretaker unit to the connection to the distribution box for the STA had been backfilled at the time of our site visit.

At the time of our site visit on October 2, 2023, the installer had completed backfilling the septic tank and piping for the caretaker unit. Risers had been installed on the septic tank access and the lids were accessible above the finished ground surface. It appeared that sufficient cover had been placed over the piping and septic tank. An as-built drawing taken from field measurements of the system is presented in Figure #1.

Based on our part time observations, it appears that the portions of the system, which were completed at the time of our site visits, had been constructed in general accordance with the design previously completed by our firm with the noted exceptions. We believe that the system should function properly with proper care and maintenance, as outlined below. If extended periods of inactivity occur at the residence, the chambers must be periodically flooded with water, every 30 days, to prevent rodents from nesting and burrowing in the chambers, which could result in another premature failure of the system.

Operation and Maintenance: Observing the operation and performing routine maintenance of the OWTS is essential for proper, long term functioning of the system. NWCC recommends the operation be periodically monitored and a qualified, licensed maintenance contractor perform system maintenance.

1. **Septic Tank:** The scum and sludge accumulation in the septic tank should be monitored yearly. Once the scum or sludge thickness reaches 25% of the chamber depth, the septic tank should be pumped. A pumping frequency of 1 to 3 years is likely at the design flows. Depending on use, pumping may only be required every 3 to 5 years.
2. **Effluent Filter:** The effluent filter at the septic tank outlet should be cleaned when the septic tank is inspected or as required.
3. **Soil Treatment Area:** The soil treatment area should be fenced off to vehicular traffic and livestock. The surface area around the soil treatment area should be observed monthly for signs of failure, such as lush vegetation growth or ponding. Liquid levels in the chambers should be observed through the inspection pipes.
4. **Treated Water:** NWCC does not recommend water softeners or water treatment systems be allowed to discharge to the OWTS. The chemical and hydraulic loading from the backwash of these treatment systems can be detrimental to the OWTS. If a treatment system is used, a separate dry well should be constructed for the backwash waste. In addition, chemically treated water from a swimming pool or spa must not be discharged into the OWTS.
5. **General Notes:** The owner should be aware that the operation of the OWTS is different from a public sewer service. Plastic and other non-biodegradable materials should not be placed into the system. Water use should be monitored so fixtures are not allowed to run if a seal malfunctions. Allowing fixtures to flow continuously to prevent water lines from freezing or a malfunctioning faucet or toilet can consume in excess of 1,000 gallons per day. Excessive flows could flood and cause premature failure of the system. No

plastic or landscaping that requires additional irrigation should be placed over the soil treatment area.

If you have any questions regarding this report, our observations or recommendations or if we may be of further service, please contact this office.

Sincerely,
NWCC, INC.,

Timothy S. Travis, P.E.
Sr. Project Engineer

Reviewed by Brian D. Len, P.E.
Principal Engineer



cc: Chris Peters - Routt County Department of Environmental Health

