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May 27, 2016

Project B1602950

Derek Spitzer, PMP Ulteig 3350 38th Avenue South Fargo, ND 58104

Re: Soil Borings and Percolation Testing Medina Rest Area (I-94 Westbound at RP 223) IM-2-094(137)223 West of Medina, North Dakota

Dear Mr. Spitzer:

We are pleased to present the results of the soil borings and percolation testing performed at the Medina Rest Area located on I-94 Westbound near Mile Marker 223, approximately 7 miles southwest of Medina, North Dakota.

We performed 4 standard penetration test soil borings and percolation tests within the proposed septic field location as shown on the attached Soil Boring Location Sketch. The soil borings were extended to a depth of 10 feet. Standard penetration tests were performed continuously to termination depth of the borings. The boreholes were allowed to remain open until the following day to establish a hydrostatic groundwater level. Upon completion of the borings, we offset the percolation test locations far enough away from the boring locations in order to not disturb groundwater levels within the borings. All percolation tests were offset approximately 10 feet to the south of each soil boring location.

For the percolation tests, we performed our tests at approximate depths of 3 to 4 feet below grade (representing the soil layer below the topsoil at each location). The hollow stem auger creates a hole that is approximately 7 ¼" in diameter. After drilling, the sides of the holes were scarified and a layer of about 3 ½ to 4 inches of gravel was placed in the bottom of the holes. A 4-inch-diameter PVC pipe with perforations near the bottom was placed in the open hole. We filled the holes to the ground surface to saturate the soil. Two of the percolation tests, P-2 and P-4, were able to be run immediately due to water levels dropping at least 12 inches within 10 minutes during the saturation phase. The remaining two percolation tests, P-1 and P-3, were refilled to ground surface and left overnight to saturate. After the saturation period, we adjusted the water levels to a depth of 5 ½ to 6 ½ inches. At intervals ranging from 5 to 20 minutes, we measured the drop in water level and the water level was re-adjusted to an approximate depth of 6 inches. We repeated the trials until the percolation rates varied by no more than 10 percent, then calculated the average percolation rate of the last 3 trials.

The results of the percolation tests, soil profile, and ground water levels encountered are presented below.

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Depth (Feet)	Soil Classification							
0 - 1/2	Sandy Lean Clay (CL), trace roots, dark brown, moist							
1⁄2 - 2	¹ / ₂ - 2 Lean Clay (CL) with Sand, brown, moist, soft.							
2 _ 7	Silty Sand (SM), fine-grained, brown, moist, loose to medium							
2 - 7	dense.							
7 – 8	Lean Clay (CL), brown, moist, stiff.							
8-9	Silty Sand (SM), fine-grained, brown, moist, loose.							
9 - 10	Silty Clay (CL-ML), trace Gravel, brown, moist, rather stiff.							

Percolation Test Hole and Soil Boring ST-01/P-1 – Northeast Quadrant of Drain Field

*Water not observed to a depth of 10 feet during the course of drilling or after the wait period.

Average Percolation Rate = 30 minutes per inch

Percolation Test Hole and Soil B	oring ST-02/P-2 – Northwest	Quadrant of Drain Field
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Depth (Feet)	Soil Classification					
0 - 1/2	Sandy Lean Clay (CL), trace roots, dark brown, moist					
1/2 - 4	Silty Sand (SM), fine- to medium-grained, brown, moist, loose. -fine- to coarse-grained with Gravel at 3 feet.					
4 - 10	Sandy Lean Clay (CL), trace Gravel, brown, moist, rather stiff to very stiff.					

*Water not observed to a depth of 10 feet during the course of drilling or after the wait period.

Average Percolation Rate = 8 minutes per inch.

Depth (Feet)	Soil Classification					
0-1	Sandy Lean Clay (CL), trace roots, dark brown, moist					
1-4	Silty Sand (SM), fine-grained, brown, moist, very loose.					
4 – 5 ½	Sandy Lean Clay (CL), brown, damp, stiff.					
5 ½ - 10	Silty Sand (SM), fine-grained, brown, moist, medium dense to loose.					

Percolation Test Hole and Soil Boring ST-03/P-3 – Southeast Quadrant of Drain Field

*Water not observed to a depth of 10 feet during the course of drilling or after the wait period.

Average Percolation Rate = 29 minutes per inch.

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Percolation Test	Hole and Soll Boring ST-04/P-4 – Southwest Quadrant of Drain Field
Depth (Feet)	Soil Classification
0-1	Sandy Lean Clay (CL), trace roots, dark brown, moist
1-5 ½	Silty Sand (SM), fine-grained, brown, moist, very loose to loose.
5 ½ – 9	Lean Clay (CL) with Sand, trace Gravel, brown and gray, moist, medium to stiff.
9 - 10	Silty Sand (SM), fine-grained, brown, moist, medium dense,

*Water not observed to a depth of 10 feet during the course of drilling or after the wait period.

Average Percolation Rate = 15 minutes per inch.

Thank you for making Braun Intertec your geotechnical consultant for this project. If you have questions about this letter, or if there are other services that we can provide in support of our work to date, please contact Jennifer McKinnon or Ezra Ballinger by phone at 701.232.8701 or by email at jmckinnon@braunintertec.com or eballinger@braunintertec.com.

Sincerely,

BRAUN INTERTEC CORPORATION

Jennifer McKinnon, PE Project Engineer

Ezra Ballinger, PE Associate Principal/Senior Engineer

Attachments Soil Boring Location Sketch Log of Borings (ST-01 through ST-04)



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LOG OF BORING

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