



1502 Grumman Lane, Suite 4
Bismarck, ND 58504
P (701) 258-2833
Terracon.com

June 8, 2023

MaryAnn Agnew Estate
19100 84th Ave NE
Menoken, ND 58558

Attn: Ms. Jan Lang
P: (701) 412-1984
E: pilgrimagejl@gmail.com

RE: Gravel Exploration Report - REVISED
Gravel Site Investigation
W1/2 Section 30, T140N, R77W
Sibley Butte Township, North Dakota
Terracon Project No. M2225143

Dear Ms. Lang:

Attached please find the logs of the flight auger borings advanced for the above-referenced project. Also attached is a map showing the approximate locations of the borings advanced on the property.

Summary of Findings

In total, fourteen (14) borings were advanced on your property between May 24 and May 25, 2023 to depths ranging from 15 to 40 feet below existing grades. Bulk samples were collected in materials classified as "Sand with Trace Gravel" and "Sand with Gravel." These classifications are determined by the percentage of gravel by weight in the material: if the sample contains less than 15 percent of gravel by weight it is considered Sand with Trace Gravel, if the sample contains less than 50 percent but more than 15 percent of gravel by weight, it is considered Sand with Gravel. There were no samples encountered on your property that were more than 50 percent gravel by weight, which would be classified as Gravel.

As shown in the logs, Sand with Trace Gravel and Sand with Gravel was encountered at depths ranging from 2 feet to 16 feet below existing grades. These materials were generally encountered along the western area of the area explored, but specifically in borings B-1, B-2, B-4, B-5, B-8, B-9, B-10, B-11, B-12, and B-14 (please see the attached Exploration Plan). Higher concentrations of gravel were encountered in borings B-2 and B-4 from approximately 3 to 16 feet below existing site grades.

Four (4) gradations were performed on samples that appeared to have the most gravel content by visual inspection and spread across the western portion of the site. The gradation results are presented in the attachments (see Sieve Analysis) and are on samples from borings B-4 (10-15 feet), B-5 (5-10 feet), B-9 (3-10 feet), and B-12 (5-10 feet). Based on the gradation results, the average amount of gravel encountered in these areas is on the order of 14 percent by weight.

Recommendations

We recommend submitting the attached pit logs and gradations to sand and gravel producers. These corporations will be able to review the results and inform you if the amount of gravel encountered is suitable for production.

We appreciate the opportunity to continue to be of service to you on this project. If you have any questions or if we may be of further service, please contact us.

Sincerely,

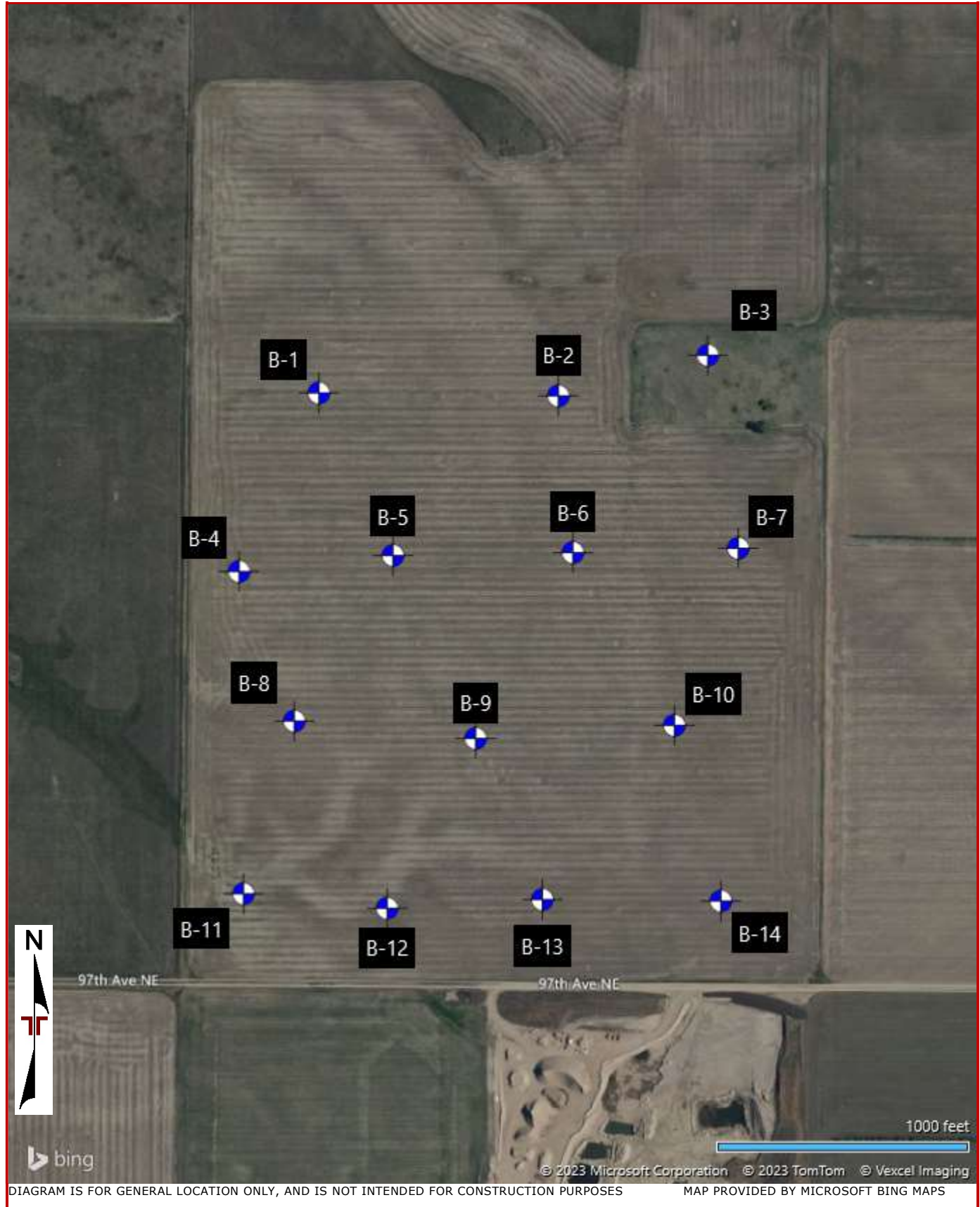
Terracon Consultants, Inc.

Kate D. Kelly, P.E.
Project Engineer

Chad A. Cowley, P.E.
Department Manager

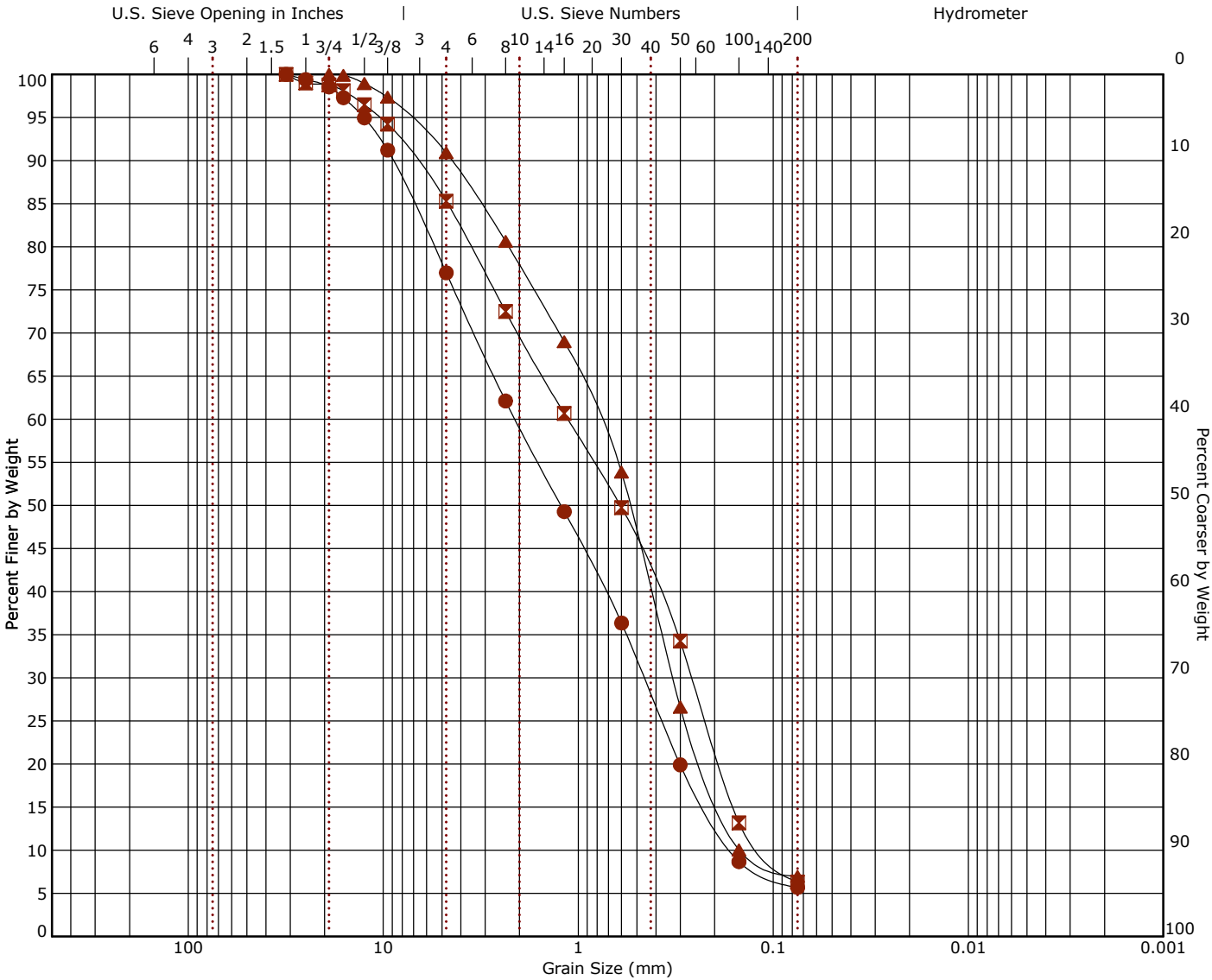
Attachments: Exploration Plan
Flight Auger Boring Logs
Sieve Analysis (2 pages)

Exploration Plan



PIT LOGGING BY TEST HOLE								PIT LOGGING BY TEST HOLE							
Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1 1/2" Screen	% Retained on 1" Screen	% Retained on 3/4" Screen	% Retained on # 4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1 1/2" Screen	% Retained on 1" Screen	% Retained on 3/4" Screen	% Retained on # 4 Screen	Bottom of Test Hole
B-1	2	4.0 Sand						B-11	2	8.0 Sand tr. Gr					
		4.0 Sand tr. Gr.								2.0 Sand					
		3.0 Sand								3.0 Clay					15 Clay
		7.0 Clay					20 Clay								
								B-12	5	7.0 Sand tr. Gr.	0	0	0.34	11.18	
B-2	3	5.0 Sand w/. Gr.								3.0 Clay					15 Clay
		12.0 Sand					20 Sand								
								B-13	4	11.0 Sand					15 Sand
B-3	4	16.0 Sand					20 Sand								
								B-14	3	7.0 Sand tr. Gr.					
B-4	3	7.0 Sand tr. Gr.								5.0 Sand					15 Sand
		6.0 Sand w/ Gr.	0	0.6	1.47	23.02									
		4.0 Clay					20 Clay								
B-5	3	10.0 Sand tr. Gr.	0	1.01	1.23	14.72									
		7.0 Clay					20 Clay								
B-6	4	6.0 Sand													
		10.0 Clay					20 Clay								
B-7	5	15.0 Sand					20 Sand								
B-8	2	11.0 Sand													
		4.0 Sand tr. Gr.						TWP.140N RNG.77W SEC.30 W1/2 COUNTYBurleigh PLATSibley Butte LAND OWNER MaryAnn Agnew Estate PIT PROSPECTED BY J. Okeefe							
		3.0 Clay					20 Clay								
B-9	3	7.0 Sand tr. Gr.	0	0	0	9.09									
		8.0 Clay													
		22.0 Sand					40 Sand								
B-10	3	5.0 Sand													
		3.0 Sand tr. Gr.													
		4.0 Sand													
		5.0 Clay					20 Clay								

Grain Size Distribution
ASTM D422 / ASTM C136

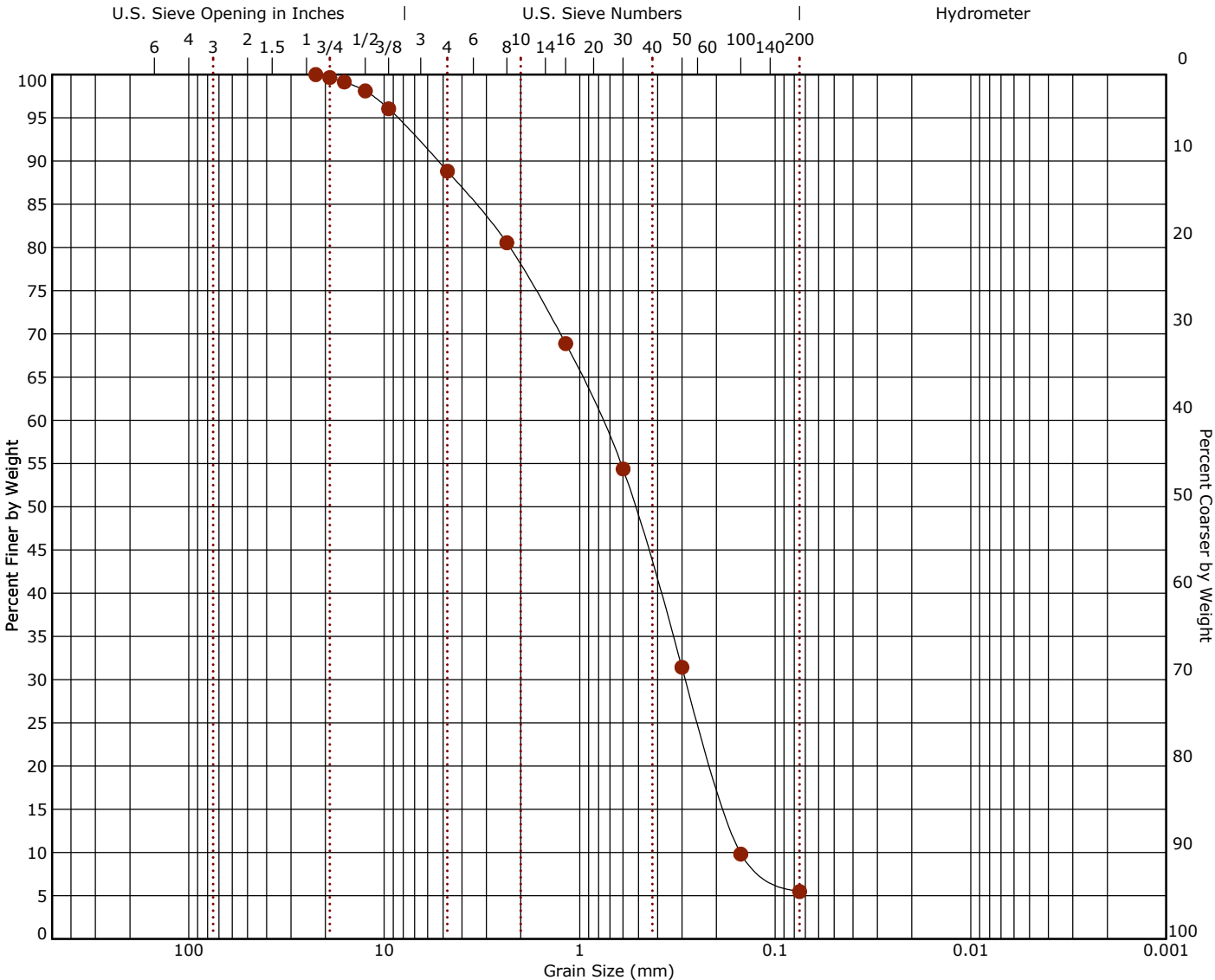


		Cobbles		Gravel		Sand			Silt or Clay	
				coarse	fine	coarse	medium	fine		
Boring ID	Depth	% Cobbles	% Gravel	% Sand	% Fines	% Silt	% Clay	USCS		
● B-4	10 - 15	0.0	23.0	71.3	5.7					
☒ B-5	5 - 10	0.0	14.7	79.0	6.3					
▲ B-9	3 - 10	0.0	9.1	83.9	7.0					

Description		●	☒	▲	Grain Size			
		Sieve	% Finer	Sieve	% Finer	Sieve	% Finer	
●		1 1/4"	100.0	1 1/4"	100.0	3/4"	100.0	D ₆₀ 2.105 1.133 0.79
☒		1"	99.4	1"	98.99	5/8"	99.89	
▲		3/4"	98.53	3/4"	98.77	1/2"	98.94	D ₃₀ 0.459 0.261 0.327
		5/8"	97.29	5/8"	98.1	3/8"	97.36	
		1/2"	94.95	1/2"	96.47	#4	90.91	D ₁₀ 0.163 0.109 0.149
		3/8"	91.21	3/8"	94.24	#8	80.62	
		#4	76.98	#4	85.28	#16	68.99	
		#8	62.11	#8	72.5	#30	53.86	
		#16	49.28	#16	60.66	#50	26.6	
		#30	36.35	#30	49.75	#100	10.04	
		#50	19.91	#50	34.25	#200	6.98	
		#100	8.67	#100	13.19			
		#200	5.68	#200	6.31			

Coefficients			
	●	☒	▲
C _c	0.61	0.55	0.91
C _u	12.93	10.41	5.31

Grain Size Distribution
ASTM D422 / ASTM C136



Cobbles		Gravel		Sand			Silt or Clay										
		coarse	fine	coarse	medium	fine											
Boring ID	Depth	% Cobbles	% Gravel	% Sand	% Fines	% Silt	% Clay	USCS									
	B-12	5 - 10	0.0	11.2	83.3	5.5											
Description									Grain Size								
					Sieve	% Finer	Sieve	% Finer	Sieve	% Finer							
				7/8"	100.0					D ₆₀	0.78						
				3/4"	99.66					D ₃₀	0.287						
				5/8"	99.14					D ₁₀	0.151						
				1/2"	98.11												
			3/8"	96.04													
Remarks				#4	88.82					Coefficients							
				#8	80.55												
				#16	68.88									C _c	0.70		
				#30	54.37					C _u	5.17						
			#50	31.42													
			#100	9.81													
			#200	5.48													