PTS File No: 41187
Client: Shaw E & I

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TABLE 1

SOIL MOISTURE RETENTION CURVE FITTING FOR QUANTIFYING THE HYDRAULIC FUNCTIONS OF UNSATURATED SOILS

PROJECT NAME: Kirtland AFB BFF
PROJECT NO: 140705
SAMPLE ID: 10660-GEO1 at 486.3 ft.

van Genuchten Parameters	
alpha (1/cm)	2.900E-02
n	2.300
residual water	0.090
total water	1.050
m	0.565
Water Perm (mD)	11283
Air Perm (mD)	16350
R^2	0.99631

Notes: alpha, n, and residual saturation are capillary parameters defined by the following equation (van Genuchten, 1980), with m = 1-1/n, S = water saturation, and h = capillary head (cm):

$$S_r + [(S_s - S_r)/(1+(\alpha h)^n)^m]$$

Laboratory Measured Data

Capillary Head (cm)	**10660-GEO1 at 486.3 ft.** Volumetric Moisture	Predicted Moisture by Curve Fit	RPD (%)
0.00	1.000	1.050	2.44%
5.66	1.000	1.042	2.04%
12.7	1.000	0.999	0.04%
22.6	0.878	0.890	0.69%
35.4	0.702	0.728	1.81%
50.9	0.516	0.567	4.70%
69.3	0.378	0.439	7.49%
90.5	0.319	0.348	4.40%
141	0.242	0.240	0.46%
239	0.178	0.167	3.12%
362	0.145	0.135	3.42%
566	0.120	0.115	2.11%
2264	0.085	0.094	4.90%

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TABLE 2

FUNCTIONAL RELATIONSHIPS BASED ON DERIVED CAPILLARY PARAMETERS

PROJECT NAME: Kirtland AFB BFF
PROJECT NO: 140705
SAMPLE ID: 10660-GEO1 at 486.3 ft.

FUNCTIONAL RELATIONSHIPS BASED ON DERIVED CAPILLARY PARAMETERS

Capillary Head (cm)	(van Genuchten, 1980) Volumetric Moisture	(Mualem, 1976) Effective Water Perm.	(Mualem, 1976) Effective Air Perm.
0.001	1.050	1.13E+04	1.18E-13
0.020	1.050	1.13E+04	8.96E-09
0.040	1.050	1.13E+04	1.21E-07
0.050	1.050	1.13E+04	2.78E-07
0.080	1.050	1.13E+04	1.62E-06
0.090	1.050	1.13E+04	2.52E-06
1.00	1.050	1.11E+04	2.11E-02
1.20	1.050	1.10E+04	4.17E-02
1.30	1.050	1.10E+04	5.63E-02
1.50	1.050	1.09E+04	9.63E-02
2.00	1.049	1.07E+04	2.83E-01
3.00	1.048	1.03E+04	1.29E+00
5.00	1.044	9.50E+03	8.65E+00
7.00	1.036	8.60E+03	2.99E+01
9.00	1.026	7.67E+03	7.46E+01
11.0	1.013	6.77E+03	1.52E+02
15.0	0.978	5.11E+03	4.40E+02
20.0	0.923	3.45E+03	1.09E+03
25.0	0.860	2.25E+03	2.03E+03
30.0	0.795	1.45E+03	3.16E+03
35.0	0.733	9.31E+02	4.38E+03
40.0	0.674	6.03E+02	5.57E+03
45.0	0.622	3.96E+02	6.69E+03
50.0	0.575	2.64E+02	7.71E+03
60.0	0.496	1.24E+02	9.39E+03
70.0	0.436	6.28E+01	1.07E+04
75.0	0.410	4.57E+01	1.12E+04
80.0	0.388	3.38E+01	1.17E+04
85.0	0.368	2.54E+01	1.21E+04
90.0	0.350	1.93E+01	1.24E+04
95.0	0.334	1.48E+01	1.27E+04
100	0.320	1.15E+01	1.30E+04
120	0.274	4.67E+00	1.38E+04
140	0.242	2.14E+00	1.44E+04
160	0.218	1.08E+00	1.47E+04
180	0.201	5.91E-01	1.50E+04
200	0.187	3.43E-01	1.52E+04
220	0.176	2.09E-01	1.54E+04
240	0.167	1.33E-01	1.55E+04
260	0.159	8.77E-02	1.56E+04
280	0.153	5.96E-02	1.57E+04

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TABLE 2

FUNCTIONAL RELATIONSHIPS BASED ON DERIVED CAPILLARY PARAMETERS

PROJECT NAME: Kirtland AFB BFF
PROJECT NO: 140705
SAMPLE ID: 10660-GEO1 at 486.3 ft.

FUNCTIONAL RELATIONSHIPS BASED ON DERIVED CAPILLARY PARAMETERS

Capillary Head (cm)	(van Genuchten, 1980) Volumetric Moisture	(Mualem, 1976) Effective Water Perm.	(Mualem, 1976) Effective Air Perm.
300	0.147	4.16E-02	1.57E+04
320	0.143	2.97E-02	1.58E+04
340	0.139	2.16E-02	1.58E+04
360	0.135	1.60E-02	1.59E+04
380	0.132	1.21E-02	1.59E+04
400	0.130	9.24E-03	1.59E+04
420	0.127	7.16E-03	1.60E+04
440	0.125	5.61E-03	1.60E+04
460	0.123	4.44E-03	1.60E+04
480	0.121	3.56E-03	1.60E+04
500	0.120	2.87E-03	1.61E+04
550	0.116	1.74E-03	1.61E+04
600	0.113	1.10E-03	1.61E+04
650	0.111	7.25E-04	1.61E+04
700	0.109	4.92E-04	1.62E+04
750	0.108	3.42E-04	1.62E+04
800	0.106	2.44E-04	1.62E+04
850	0.105	1.78E-04	1.62E+04
900	0.104	1.32E-04	1.62E+04
950	0.103	9.90E-05	1.62E+04
1000	0.102	7.57E-05	1.62E+04
1050	0.101	5.86E-05	1.62E+04
1100	0.101	4.59E-05	1.63E+04
1150	0.100	3.63E-05	1.63E+04
1200	0.100	2.91E-05	1.63E+04
1250	0.099	2.35E-05	1.63E+04
1300	0.099	1.91E-05	1.63E+04
1350	0.098	1.57E-05	1.63E+04
1400	0.098	1.29E-05	1.63E+04
1450	0.097	1.08E-05	1.63E+04
1500	0.097	9.01E-06	1.63E+04
1550	0.097	7.58E-06	1.63E+04
1600	0.097	6.42E-06	1.63E+04
1650	0.096	5.46E-06	1.63E+04
1700	0.096	4.67E-06	1.63E+04
1750	0.096	4.01E-06	1.63E+04
1800	0.096	3.46E-06	1.63E+04
1850	0.095	3.00E-06	1.63E+04
1900	0.095	2.60E-06	1.63E+04
1950	0.095	2.27E-06	1.63E+04
2000	0.095	1.99E-06	1.63E+04

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TABLE 2

FUNCTIONAL RELATIONSHIPS BASED ON DERIVED CAPILLARY PARAMETERS

PROJECT NAME: Kirtland AFB BFF
PROJECT NO: 140705
SAMPLE ID: 10660-GEO1 at 486.3 ft.

FUNCTIONAL RELATIONSHIPS BASED ON DERIVED CAPILLARY PARAMETERS

Capillary Head (cm)	(van Genuchten, 1980) Volumetric Moisture	(Mualem, 1976) Effective Water Perm.	(Mualem, 1976) Effective Air Perm.
2200	0.094	1.21E-06	1.63E+04
2400	0.094	7.64E-07	1.63E+04
2600	0.093	5.02E-07	1.63E+04
2800	0.093	3.40E-07	1.63E+04
3000	0.093	2.37E-07	1.63E+04
3200	0.093	1.69E-07	1.63E+04
3400	0.092	1.23E-07	1.63E+04
3600	0.092	9.09E-08	1.63E+04
3800	0.092	6.84E-08	1.63E+04
4000	0.092	5.23E-08	1.63E+04
4200	0.092	4.05E-08	1.63E+04
4400	0.092	3.17E-08	1.63E+04
4600	0.092	2.51E-08	1.63E+04
4800	0.092	2.01E-08	1.63E+04
5000	0.091	1.62E-08	1.63E+04
5200	0.091	1.32E-08	1.63E+04
5400	0.091	1.08E-08	1.63E+04
5600	0.091	8.94E-09	1.63E+04
5800	0.091	7.43E-09	1.63E+04
6000	0.091	6.22E-09	1.63E+04
6500	0.091	4.09E-09	1.63E+04
7000	0.091	2.77E-09	1.63E+04
7500	0.091	1.93E-09	1.63E+04
8000	0.091	1.37E-09	1.63E+04
8500	0.091	1.00E-09	1.63E+04
9000	0.091	7.40E-10	1.63E+04
9500	0.091	5.57E-10	1.63E+04
10000	0.091	4.26E-10	1.63E+04

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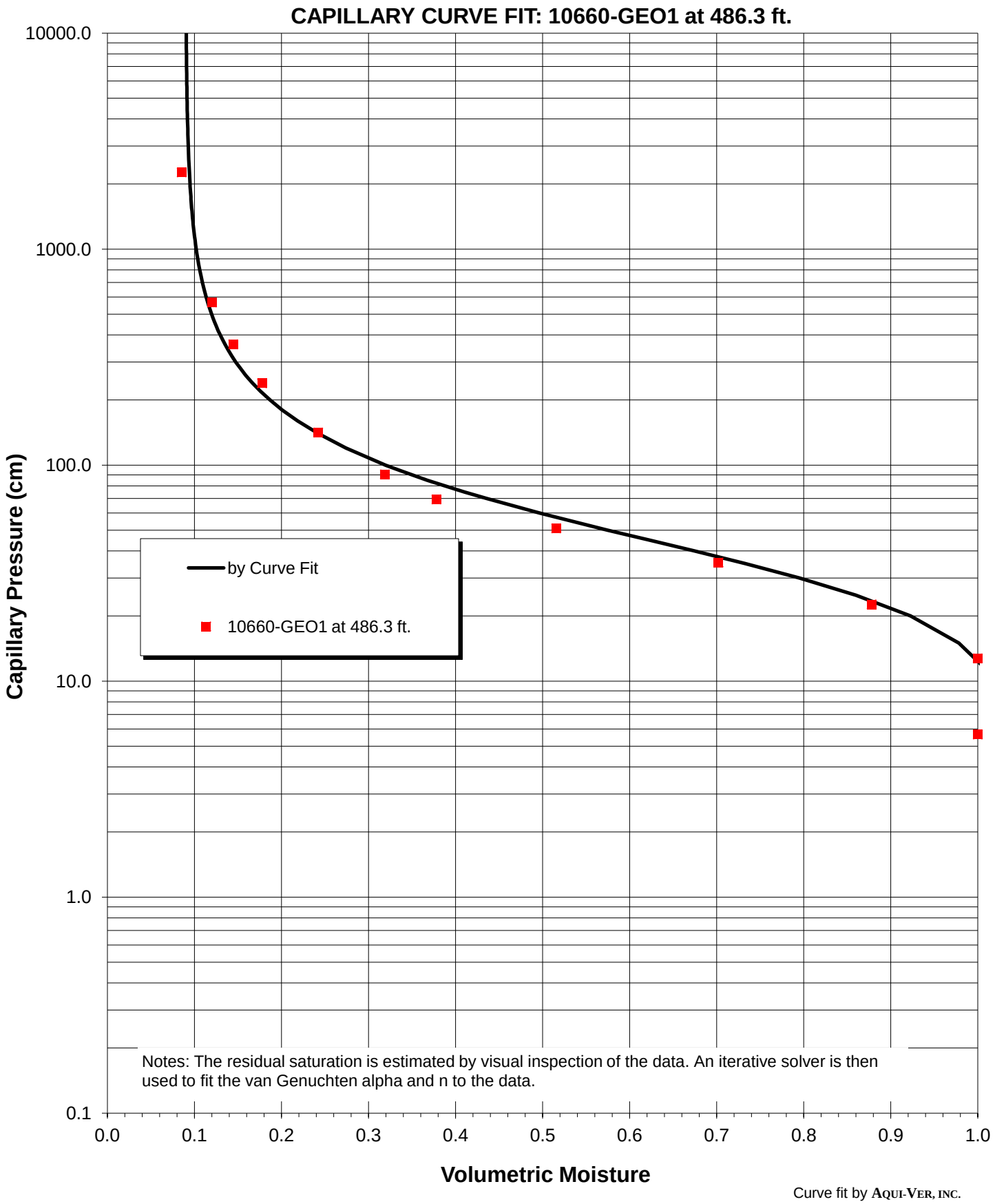

Curve fit by AQUI-VER, INC.

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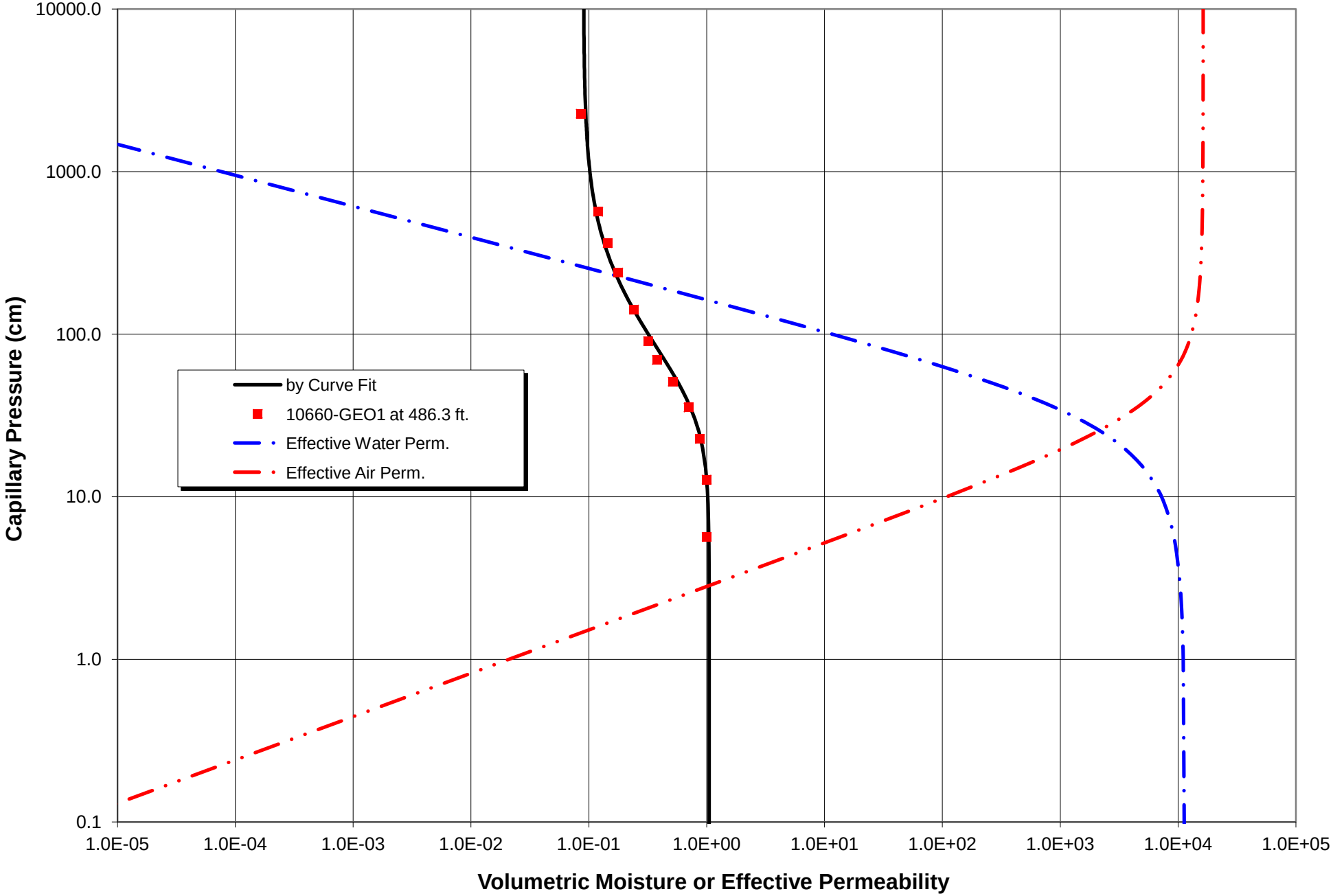
CAPILLARY CURVE FIT: 10660-GEO1 at 486.3 ft.



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