COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF:	)	
	)	
THE APPLICATION OF KENTUCKY-AMERICAN	)	
WATER COMPANY FOR A CERTIFICATE OF	)	**CASE NO. 2007-00134**
CONVENIENCE AND NECESSITY AUTHORIZING	)	
THE CONSTRUCTION OF KENTUCKY RIVER	)	
STATION II, ASSOCIATED FACILITIES AND	)	
TRANSMISSION MAIN	)	

CERTIFICATE OF SERVICE

This is to certify that the original and eight (8) copies of the Kentucky American Water's Responses to Hearing Data Requests have been filed with the Public Service Commission this the 10th day of December, 2007, and a copy mailed to:

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By _____
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KENTUCKY-AMERICAN WATER COMPANY
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1. In relation to the acquisition of easements from private landowners that will be necessary for the construction of the pipeline from its origin near Pool 3 to Central Kentucky, provide the total number of easements that will need to be obtained from private landowners, the number of easements from private landowners that have been obtained to date, and the number of private landowners who have indicated a refusal to grant such a private easement.

Response:

At this time, a total of one hundred and four (104) easements are being sought from private land owners; ten (10) easement agreements have been obtained; and sixteen (16) private landowners have indicated a refusal to grant an easement, several stating a preference for no action until the PSC issues a certificate.

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2. In relation to the acquisition of property rights that will be necessary for the construction of the pipeline from its origin near Pool 3 to Central Kentucky, provide a map or other suitable drawing of the proposed pipeline which shows the ownership nature of the property rights (public or private) to be acquired.

Response:

Refer to the attached map titled *High Service Mains Easement Exhibit.*

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3. For the pipeline to the Ohio River that Kentucky American Water considered in the late 1990's, provide the amount of private and public property as percentages of all property rights that would had to have been obtained for the construction of that pipeline. Your answer should include the information for the three various pipeline routes that were considered in the late 1990's.

Response:

The original route was to begin at a metering point at the Jefferson/Shelby County line, approximately ½ mile south of I-64. From there, it was to parallel I-64 east to KY 151 in Shelby County, then generally parallel an existing gas transmission main east to US 60 (Versailles Road), where it paralleled an existing overhead power line east until reaching KY 1681. Upon reaching KY 1681, it connected with the KAW distribution system at New Circle Road. It was anticipated that 100% of this line would be installed in private easement obtained by KAW except as the facilities crossed existing road rights-of-way.

Prior to soliciting engineering proposals, KAW moved the metering point to the KY 53 and I-64 interchange, less than ¼ mile south of the Interstate. KAW also changed the route to continue north to US 421 (Leestown Road) and connect to the Mercer Road Tank. It was again anticipated that 100% of this line would be in private easement obtained by KAW except as the facilities crossed existing road rights-of-way.

In mid-1998, KAW began looking at alternative alignments but again it was anticipated that all facilities would be in private easement obtained by KAW except as the facilities crossed existing road rights-of-way.

In November 1998, KAW began pursuing a route that paralleled I-64 from the metering point to Midway in Woodford County, then follow US 421 east into Fayette County with an alternative alignment to parallel I-64 all the way to Greendale Road in Fayette County. There was a short section in Franklin County that was routed along Johnson Road for 2.2 miles just south of the interstate in both alternatives which would have likely been in the road right-of-way, and represented 4% of the project. It was anticipated that 96% of this line would be installed in private easement obtained by KAW except as the facilities crossed existing road rights-of-way. KAW had existing easements in US 421 and it was hoped that some of the existing easements could be utilized.

Because the design was stopped at about 60%, final alignment was never completed and easement acquisition was never initiated.

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4. Provide the maximum daily demand for 2007 for the period prior to the implementation of any water use restrictions. Provide the same information for the period after water use restrictions were implemented.

Response:

Voluntary restrictions were implemented August 16, 2007. Prior to that day, the maximum daily demand was 64.299 mgd on June 15. Subsequent to that day, the maximum daily demand was 56.823 mgd on September 16.

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5. Provide daily Pool 3 water flow information for 2007.

   a. How does the 2007 drought compare to other historical droughts?

   b. Considering the 2007 drought, what is the computed low flow at KAW's proposed intake since the construction of Buckhorn and Carr Fork?

Response:

As indicated by Mr. Svindland in his cross examination, there is not a direct measurement flow gage on Pool 3 of the Kentucky River. There are flow gages at Kentucky River Lock and Dam 2, Kentucky River Lock and Dam 4 and Elkhorn Creek as it enters Pool 3. Please also note that 2007 flow data is considered provisional at this time.

Attached to this data response are the daily 2007 mean flows in cubic feet per second (cfs) for Pool 2, Pool 4, Elkhorn and the sum of Pool 4 & Elkhorn. Included at the end of each data set are the computed minimum daily flow and the lowest 7 day average flow for Pool 2 and Pool 4 plus Elkhorn. To compute flows in MGD multiply the cfs value by 0.646272 (7.48*60*1440/1000000). Note that these values are the same values that Mr. Svindland indicated in his cross examination, namely, 81 MGD for Pool 2 and 67.4 MGD for the sum of Pool 4 and Elkhorn. The available flow at KAW's proposed intake would fall between these two values.

a. Using Pool 2 lowest 7 day average flows as a point of comparison, the top 5 historical droughts are:

Table 1 – 5 Worst Historical Droughts

Rank	Year	Lowest 7 day average Flow (cfs)	Lowest 7 day average Flow (MGD)
1	1930	60	39
2	1941	110	71
3	1999	125	81
4	2007	126	81
5	2005	146	94

In 1960 Buckhorn Lake was created and in 1976 Carr Fork Lake was created. Both of these lakes have greatly influenced Kentucky River flows by stabilizing low flows. This change is seen in the Gannett Fleming Pool 3 safe yield analysis. Again, using Pool 2 lowest 7 day average flows as a point of comparison, the top

5 droughts in the period 1960 to the present are:

Table 2 – 5 Worst Droughts since Construction of Buckhorn & Carr Fork

Rank	Year	Lowest 7 day average Flow (cfs)	Lowest 7 day average Flow (MGD)
1	1999	125	81
2	2007	126	81
3	2005	146	94
4	1995	166	107
5	1988	172	111

Comparing the above two tables, one can see the construction of Buckhorn Lake and Carr Fork Lake eliminated the historical droughts and that the river has been able to consistently provide 81 MGD of flow at Pool 2.

b. Using the drainage area comparison calculation as used by KY DOW in their Surface Water Permit Fact Sheet, the expected low flow at the proposed intake is computed as follows:

$$\frac{\text{Flow at Pool 2}}{\text{Drainage Area at Pool 2}} = \frac{\text{Flow at Proposed Intake}}{\text{Drainage Area at Proposed Intake}}$$

$$\frac{81\ \text{MGD at Pool 2}}{6180\ \text{mi}^2\ \text{at Pool 2}} = \frac{\text{Q at Proposed Intake}}{5965\ \text{mi}^2\ \text{at Proposed Intake}}$$

$$\text{solving for Q} = 78\ \text{MGD}$$

Thus the expected low flow during a major drought is estimated to be 78 MGD without pool mining and without improvement to lock and dam 3. This value is more than three times the projected need when the facilities are placed into service.

2007 Pool 2 Flow Data

---------- WARNING ----------
The data you have obtained from this automated U.S. Geological Survey database
have not received Director's approval and as such are provisional and subject to
revision. The data are released on the condition that neither the USGS nor the
United States Government may be held liable for any damages resulting from its use.
Additional info: http://waterdata.usgs.gov/nwis/help/?provisional
#
File-format description: http://waterdata.usgs.gov/nwis/?tab_delimited_format_info
Automated-retrieval info: http://waterdata.usgs.gov/nwis/?automated_retrieval_info
#
Contact: gs-w_support_nwisweb@usgs.gov
retrieved: 2007-12-04 08:34:14 EST
#
Data for the following site(s) are contained in this file
USGS 03290500 KENTUCKY RIVER AT LOCK 2 AT LOCKPORT, KY

#
Data provided for site 03290500
DD parameter statistic Description
06 00060 00003 Discharge, cubic feet per second (Mean)
#
Data-value qualification codes included in this output:
P Provisional data subject to revision.
#

agency_cd	site_no	datetime	06_00060_	06_00060_00003_cd	
5s	15s	16d	14n	10s	7 day avg
USGS	3290500	1/1/2007	10200	P	
USGS	3290500	1/2/2007	8620	P	
USGS	3290500	1/3/2007	7920	P	
USGS	3290500	1/4/2007	7930	P	
USGS	3290500	1/5/2007	9200	P	
USGS	3290500	1/6/2007	10500	P	
USGS	3290500	1/7/2007	11300	P	9,381
USGS	3290500	1/8/2007	25400	P	11,553
USGS	3290500	1/9/2007	31300	P	14,793
USGS	3290500	1/10/2007	28000	P	17,661
USGS	3290500	1/11/2007	22000	P	19,671
USGS	3290500	1/12/2007	17800	P	20,900
USGS	3290500	1/13/2007	15500	P	21,614
USGS	3290500	1/14/2007	20600	P	22,943
USGS	3290500	1/15/2007	19000	P	22,029
USGS	3290500	1/16/2007	21800	P	20,671
USGS	3290500	1/17/2007	19600	P	19,471
USGS	3290500	1/18/2007	16700	P	18,714
USGS	3290500	1/19/2007	14400	P	18,229
USGS	3290500	1/20/2007	11900	P	17,714
USGS	3290500	1/21/2007	10600	P	16,286
USGS	3290500	1/22/2007	12100	P	15,300
USGS	3290500	1/23/2007	12500	P	13,971

USGS	3290500	1/24/2007	13400 P	13,086
USGS	3290500	1/25/2007	13800 P	12,671
USGS	3290500	1/26/2007	12500 P	12,400
USGS	3290500	1/27/2007	10700 P	12,229
USGS	3290500	1/28/2007	9230 P	12,033
USGS	3290500	1/29/2007	8130 P	11,466
USGS	3290500	1/30/2007	7260 P	10,717
USGS	3290500	1/31/2007	6540 P	9,737
USGS	3290500	2/1/2007	5970 P	8,619
USGS	3290500	2/2/2007	5510 P	7,620
USGS	3290500	2/3/2007	5150 P	6,827
USGS	3290500	2/4/2007	4940 P	6,214
USGS	3290500	2/5/2007	4670 P	5,720
USGS	3290500	2/6/2007	4280 P	5,294
USGS	3290500	2/7/2007	4060 P	4,940
USGS	3290500	2/8/2007	3780 P	4,627
USGS	3290500	2/9/2007	3540 P	4,346
USGS	3290500	2/10/2007	3470 P	4,106
USGS	3290500	2/11/2007	3410 P	3,887
USGS	3290500	2/12/2007	3360 P	3,700
USGS	3290500	2/13/2007	7780 P	4,200
USGS	3290500	2/14/2007	16000 P	5,906
USGS	3290500	2/15/2007	12900 P	7,209
USGS	3290500	2/16/2007	8470 P	7,913
USGS	3290500	2/17/2007	6330 P	8,321
USGS	3290500	2/18/2007	5380 P	8,603
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USGS	3290500	3/13/2007	6100 P	9,279
USGS	3290500	3/14/2007	5840 P	8,056
USGS	3290500	3/15/2007	7790 P	7,483
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USGS	3290500	3/17/2007	8750 P	7,191
USGS	3290500	3/18/2007	8910 P	7,384
USGS	3290500	3/19/2007	7770 P	7,520
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USGS	3290500	3/21/2007	7850 P	8,137
USGS	3290500	3/22/2007	6790 P	7,994
USGS	3290500	3/23/2007	6290 P	7,824
USGS	3290500	3/24/2007	5700 P	7,389
USGS	3290500	3/25/2007	5210 P	6,860
USGS	3290500	3/26/2007	4800 P	6,436
USGS	3290500	3/27/2007	5030 P	5,953
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USGS	3290500	3/29/2007	9420 P	6,063
USGS	3290500	3/30/2007	10900 P	6,721
USGS	3290500	3/31/2007	7810 P	7,023
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USGS	3290500	6/3/2007	617	P	736
USGS	3290500	6/4/2007	644	P	709
USGS	3290500	6/5/2007	810	P	713
USGS	3290500	6/6/2007	702	P	684
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USGS	3290500	6/8/2007	1270	P	818
USGS	3290500	6/9/2007	1270	P	925
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USGS	3290500	6/11/2007	1140	P	1,086
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USGS	3290500	6/16/2007	503	P	796
USGS	3290500	6/17/2007	359	P	669
USGS	3290500	6/18/2007	319	P	552
USGS	3290500	6/19/2007	314	P	458
USGS	3290500	6/20/2007	366	P	411
USGS	3290500	6/21/2007	256	P	374
USGS	3290500	6/22/2007	285	P	343
USGS	3290500	6/23/2007	253	P	307
USGS	3290500	6/24/2007	240	P	290
USGS	3290500	6/25/2007	269	P	283
USGS	3290500	6/26/2007	276	P	278
USGS	3290500	6/27/2007	327	P	272
USGS	3290500	6/28/2007	294	P	278

USGS	3290500	6/29/2007	403 P	295
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USGS	3290500	8/26/2007	368 P	391
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USGS	3290500	8/28/2007	263 P	412
USGS	3290500	8/29/2007	231 P	386
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USGS	3290500	8/31/2007	333 P	313
USGS	3290500	9/1/2007	382 P	303
USGS	3290500	9/2/2007	302 P	293
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		Min. daily flow	114	cfs	Min 7 day avg	126	cfs
			74	mgd		81	mgd

2007 Pool 4 Flow Data

---------- WARNING ----------
The data you have obtained from this automated U.S. Geological Survey database
have not received Director's approval and as such are provisional and subject to
revision. The data are released on the condition that neither the USGS nor the
United States Government may be held liable for any damages resulting from its use.
Additional info: http://waterdata.usgs.gov/nwis/help/?provisional
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File-format description: http://waterdata.usgs.gov/nwis/?tab_delimited_format_info
Automated-retrieval info: http://waterdata.usgs.gov/nwis/?automated_retrieval_info
#
Contact: gs-w_support_nwisweb@usgs.gov
retrieved: 2007-12-04 08:44:03 EST
#
Data for the following site(s) are contained in this file
USGS 03287500 KENTUCKY RIVER AT LOCK 4 AT FRANKFORT, KY

#
Data provided for site 03287500
DD parameter statistic Description
02 00060 00003 Discharge, cubic feet per second (Mean)
#
Data-value qualification codes included in this output:
P Provisional data subject to revision.
#

agency_cd	site_no	datetime	02_00060	02_00060_00003_cd	
5s	15s	16d	14n	10s	7 day avg
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USGS	3287500	12/3/2007	2790	P		3,489	
		Min. daily flow	54	cfs	Min 7 day avg	66	cfs
			35	mgd		42.75	mgd

2007 Elkhorn Flow Data

---------- WARNING ----------
The data you have obtained from this automated U.S. Geological Survey database
have not received Director's approval and as such are provisional and subject to
revision. The data are released on the condition that neither the USGS nor the
United States Government may be held liable for any damages resulting from its use.
Additional info: http://waterdata.usgs.gov/nwis/help/?provisional
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File-format description: http://waterdata.usgs.gov/nwis/?tab_delimited_format_info
Automated-retrieval info: http://waterdata.usgs.gov/nwis/?automated_retrieval_info
#
Contact: gs-w_support_nwisweb@usgs.gov
retrieved: 2007-12-04 08:48:56 EST
#
Data for the following site(s) are contained in this file
USGS 03289500 ELKHORN CREEK NEAR FRANKFORT, KY

#
Data provided for site 03289500
DD parameter statistic Description
02 00060 00001 Discharge, cubic feet per second (Maximum)
02 00060 00002 Discharge, cubic feet per second (Minimum)
02 00060 00003 Discharge, cubic feet per second (Mean)
#
Data-value qualification codes included in this output:
P Provisional data subject to revision.
#

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USGS	3289500	11/29/2007	773 P		253	
USGS	3289500	11/30/2007	533 P		341	
USGS	3289500	12/1/2007	388 P		399	
USGS	3289500	12/2/2007	319 P		445	
USGS	3289500	12/3/2007	924 P		587	
		Min. daily flow	28.0 cfs	Min 7 day avg	29.0	cfs
			18.1 mgd		18.7	mgd

2007 Computation of 7 day Average Flow for Pool 4 + Elkhorn

	flow (cfs)			
Date	Pool 4	Elkhorn	sum	7 day avg
1/1/2007	7450	1640	9090	
1/2/2007	6940	1240	8180	
1/3/2007	6770	999	7769	
1/4/2007	7050	856	7906	
1/5/2007	7980	1250	9230	
1/6/2007	8180	1970	10150	
1/7/2007	10400	1650	12050	9,196
1/8/2007	26600	2530	29130	12,059
1/9/2007	28600	2420	31020	15,322
1/10/2007	25400	1720	27120	18,087
1/11/2007	20000	1280	21280	19,997
1/12/2007	15900	1030	16930	21,097
1/13/2007	13500	1010	14510	21,720
1/14/2007	15100	3380	18480	22,639
1/15/2007	13900	3450	17350	20,956
1/16/2007	17700	4150	21850	19,646
1/17/2007	15300	2960	18260	18,380
1/18/2007	12700	2060	14760	17,449
1/19/2007	11400	1530	12930	16,877
1/20/2007	10200	1170	11370	16,429
1/21/2007	9360	998	10358	15,268
1/22/2007	11100	1180	12280	14,544
1/23/2007	11500	1080	12580	13,220
1/24/2007	13000	914	13914	12,599
1/25/2007	13100	796	13896	12,475
1/26/2007	11500	697	12197	12,371
1/27/2007	9810	622	10432	12,237
1/28/2007	8440	543	8983	12,040
1/29/2007	7490	457	7947	11,421
1/30/2007	6700	394	7094	10,638
1/31/2007	6060	344	6404	9,565
2/1/2007	5540	310	5850	8,415
2/2/2007	5100	296	5396	7,444
2/3/2007	4810	273	5083	6,680
2/4/2007	4650	253	4903	6,097
2/5/2007	4360	224	4584	5,616
2/6/2007	4050	228	4278	5,214
2/7/2007	3790	268	4058	4,879
2/8/2007	3480	260	3740	4,577
2/9/2007	3350	230	3580	4,318
2/10/2007	3300	230	3530	4,096
2/11/2007	3260	195	3455	3,889
2/12/2007	3160	181	3341	3,712
2/13/2007	5810	1190	7000	4,101
2/14/2007	10500	4080	14580	5,604
2/15/2007	9610	1930	11540	6,718
2/16/2007	6530	1070	7600	7,292

2/17/2007	5190	0	5190	7,529
2/18/2007	4560	565	5125	7,768
2/19/2007	4170	436	4606	7,949
2/20/2007	3800	391	4191	7,547
2/21/2007	3250	443	3693	5,992
2/22/2007	3750	541	4291	4,957
2/23/2007	4920	479	5399	4,642
2/24/2007	5180	406	5586	4,699
2/25/2007	7860	1450	9310	5,297
2/26/2007	8060	1730	9790	6,037
2/27/2007	7650	1260	8910	6,711
2/28/2007	6520	966	7486	7,253
3/1/2007	6850	859	7709	7,741
3/2/2007	22600	2550	25150	10,563
3/3/2007	33300	2660	35960	14,902
3/4/2007	34200	1660	35860	18,695
3/5/2007	24600	1200	25800	20,982
3/6/2007	16100	950	17050	22,145
3/7/2007	12800	758	13558	23,012
3/8/2007	10700	631	11331	23,530
3/9/2007	8890	519	9409	21,281
3/10/2007	7750	444	8194	17,315
3/11/2007	6990	389	7379	13,246
3/12/2007	6300	334	6634	10,508
3/13/2007	5580	297	5877	8,912
3/14/2007	5110	286	5396	7,746
3/15/2007	5540	451	5991	6,983
3/16/2007	6840	501	7341	6,687
3/17/2007	8580	387	8967	6,798
3/18/2007	8220	306	8526	6,962
3/19/2007	7140	267	7407	7,072
3/20/2007	7000	285	7285	7,273
3/21/2007	6630	336	6966	7,498
3/22/2007	6210	309	6519	7,573
3/23/2007	5680	276	5956	7,375
3/24/2007	5200	249	5449	6,873
3/25/2007	4730	223	4953	6,362
3/26/2007	4480	206	4686	5,973
3/27/2007	4720	194	4914	5,635
3/28/2007	4950	247	5197	5,382
3/29/2007	9230	1320	10550	5,958
3/30/2007	9000	1160	10160	6,558
3/31/2007	6200	764	6964	6,775
4/1/2007	5850	974	6824	7,042
4/2/2007	5280	1180	6460	7,296
4/3/2007	4610	886	5496	7,379
4/4/2007	7640	1690	9330	7,969
4/5/2007	8780	1850	10630	7,981
4/6/2007	8610	1260	9870	7,939
4/7/2007	7770	963	8733	8,192
4/8/2007	6960	744	7704	8,318
4/9/2007	6100	596	6696	8,351

4/10/2007	5090	481	5571	8,362
4/11/2007	4480	418	4898	7,729
4/12/2007	4420	476	4896	6,910
4/13/2007	4230	493	4723	6,174
4/14/2007	8530	964	9494	6,283
4/15/2007	24500	4230	28730	9,287
4/16/2007	28000	3070	31070	12,769
4/17/2007	34900	1950	36850	17,237
4/18/2007	33600	1380	34980	21,535
4/19/2007	23000	1080	24080	24,275
4/20/2007	15700	859	16559	25,966
4/21/2007	13600	682	14282	26,650
4/22/2007	11800	549	12349	24,310
4/23/2007	9860	442	10302	21,343
4/24/2007	8390	399	8789	17,334
4/25/2007	7220	416	7636	13,428
4/26/2007	6410	381	6791	10,958
4/27/2007	6220	683	6903	9,579
4/28/2007	6230	612	6842	8,516
4/29/2007	5800	413	6213	7,639
4/30/2007	5590	310	5900	7,011
5/1/2007	4760	262	5022	6,472
5/2/2007	3930	230	4160	5,976
5/3/2007	3720	214	3934	5,568
5/4/2007	3780	241	4021	5,156
5/5/2007	5450	295	5745	4,999
5/6/2007	11900	644	12544	5,904
5/7/2007	13700	638	14338	7,109
5/8/2007	12500	410	12910	8,236
5/9/2007	9340	290	9630	9,017
5/10/2007	6990	232	7222	9,487
5/11/2007	5540	196	5736	9,732
5/12/2007	4490	171	4661	9,577
5/13/2007	3740	145	3885	8,340
5/14/2007	3170	126	3296	6,763
5/15/2007	2800	112	2912	5,335
5/16/2007	2430	105	2535	4,321
5/17/2007	2230	111	2341	3,624
5/18/2007	2170	117	2287	3,131
5/19/2007	2160	102	2262	2,788
5/20/2007	2050	97	2147	2,540
5/21/2007	1890	86	1976	2,351
5/22/2007	1590	80	1670	2,174
5/23/2007	1380	75	1455	2,020
5/24/2007	1200	68	1268	1,866
5/25/2007	1060	63	1123	1,700
5/26/2007	864	59	923	1,509
5/27/2007	1010	54	1064	1,354
5/28/2007	696	51	747	1,179
5/29/2007	779	48	827	1,058
5/30/2007	855	54	909	980
5/31/2007	747	51	798	913

6/1/2007	482	47	529	828
6/2/2007	516	46	562	777
6/3/2007	579	45	624	714
6/4/2007	604	43	647	699
6/5/2007	780	51	831	700
6/6/2007	638	130	768	680
6/7/2007	1150	142	1292	750
6/8/2007	1140	97	1237	852
6/9/2007	1150	89	1239	948
6/10/2007	1140	76	1216	1,033
6/11/2007	1030	62	1092	1,096
6/12/2007	865	55	920	1,109
6/13/2007	490	50	540	1,077
6/14/2007	509	44	553	971
6/15/2007	559	41	600	880
6/16/2007	481	37	518	777
6/17/2007	377	33	410	662
6/18/2007	358	30	388	561
6/19/2007	389	30	419	490
6/20/2007	364	34	398	469
6/21/2007	275	47	322	436
6/22/2007	319	37	356	402
6/23/2007	263	34	297	370
6/24/2007	294	35	329	358
6/25/2007	305	37	342	352
6/26/2007	325	41	366	344
6/27/2007	321	47	368	340
6/28/2007	318	48	366	346
6/29/2007	421	119	540	373
6/30/2007	282	126	408	388
7/1/2007	305	129	434	403
7/2/2007	302	81	383	409
7/3/2007	341	59	400	414
7/4/2007	376	47	423	422
7/5/2007	576	150	726	473
7/6/2007	886	756	1642	631
7/7/2007	934	357	1291	757
7/8/2007	821	174	995	837
7/9/2007	468	114	582	866
7/10/2007	546	85	631	899
7/11/2007	452	73	525	913
7/12/2007	383	93	476	877
7/13/2007	463	71	534	719
7/14/2007	283	59	342	584
7/15/2007	299	56	355	492
7/16/2007	317	50	367	461
7/17/2007	348	46	394	428
7/18/2007	384	51	435	415
7/19/2007	460	167	627	436
7/20/2007	690	263	953	496
7/21/2007	744	258	1002	590
7/22/2007	659	156	815	656

7/23/2007	690	111	801	718
7/24/2007	652	81	733	767
7/25/2007	422	66	488	774
7/26/2007	461	55	516	758
7/27/2007	382	52	434	684
7/28/2007	815	312	1127	702
7/29/2007	2920	844	3764	1,123
7/30/2007	2750	413	3163	1,461
7/31/2007	2710	233	2943	1,776
8/1/2007	2240	172	2412	2,051
8/2/2007	1670	129	1799	2,235
8/3/2007	1280	99	1379	2,370
8/4/2007	1040	82	1122	2,369
8/5/2007	687	77	764	1,940
8/6/2007	539	79	618	1,577
8/7/2007	601	97	698	1,256
8/8/2007	655	75	730	1,016
8/9/2007	594	64	658	853
8/10/2007	487	56	543	733
8/11/2007	460	50	510	646
8/12/2007	402	45	447	601
8/13/2007	344	39	383	567
8/14/2007	322	37	359	519
8/15/2007	259	35	294	456
8/16/2007	201	35	236	396
8/17/2007	152	34	186	345
8/18/2007	120	32	152	294
8/19/2007	110	33	143	250
8/20/2007	107	34	141	216
8/21/2007	261	36	297	207
8/22/2007	329	293	622	254
8/23/2007	302	149	451	285
8/24/2007	309	146	455	323
8/25/2007	271	97	368	354
8/26/2007	223	73	296	376
8/27/2007	188	58	246	391
8/28/2007	152	49	201	377
8/29/2007	125	47	172	313
8/30/2007	229	49	278	288
8/31/2007	331	93	424	284
9/1/2007	237	72	309	275
9/2/2007	151	61	212	263
9/3/2007	104	52	156	250
9/4/2007	78	49	127	240
9/5/2007	64	42	106	230
9/6/2007	58	39	97	204
9/7/2007	56	35	91	157
9/8/2007	54	34	88	125
9/9/2007	61	34	95	109
9/10/2007	92	34	126	104
9/11/2007	101	37	138	106
9/12/2007	151	51	202	120

9/13/2007	158	42	200	134
9/14/2007	139	36	175	146
9/15/2007	225	33	258	171
9/16/2007	338	0	338	205
9/17/2007	326	30	356	238
9/18/2007	280	29	309	263
9/19/2007	234	30	264	271
9/20/2007	184	31	215	274
9/21/2007	151	30	181	274
9/22/2007	125	29	154	260
9/23/2007	97	29	126	229
9/24/2007	86	28	114	195
9/25/2007	71	28	99	165
9/26/2007	91	28	119	144
9/27/2007	210	38	248	149
9/28/2007	193	58	251	159
9/29/2007	112	89	201	165
9/30/2007	93	70	163	171
10/1/2007	139	55	194	182
10/2/2007	135	51	186	195
10/3/2007	141	44	185	204
10/4/2007	138	40	178	194
10/5/2007	139	37	176	183
10/6/2007	137	36	173	179
10/7/2007	123	67	190	183
10/8/2007	119	45	164	179
10/9/2007	111	37	148	173
10/10/2007	96	35	131	166
10/11/2007	86	34	120	157
10/12/2007	77	33	110	148
10/13/2007	74	32	106	138
10/14/2007	76	33	109	127
10/15/2007	83	32	115	120
10/16/2007	97	34	131	117
10/17/2007	101	32	133	118
10/18/2007	122	40	162	124
10/19/2007	125	42	167	132
10/20/2007	102	42	144	137
10/21/2007	88	61	149	143
10/22/2007	135	55	190	154
10/23/2007	2480	203	2683	518
10/24/2007	4810	2900	7710	1,601
10/25/2007	2860	2010	4870	2,273
10/26/2007	2870	884	3754	2,786
10/27/2007	2110	487	2597	3,136
10/28/2007	1400	304	1704	3,358
10/29/2007	1070	215	1285	3,515
10/30/2007	815	171	986	3,272
10/31/2007	798	142	940	2,305
11/1/2007	671	121	792	1,723
11/2/2007	442	106	548	1,265
11/3/2007	502	91	593	978

11/4/2007	459	82	541			812	
11/5/2007	387	80	467			695	
11/6/2007	457	94	551			633	
11/7/2007	439	141	580			582	
11/8/2007	383	123	506			541	
11/9/2007	307	118	425			523	
11/10/2007	398	98	496			509	
11/11/2007	423	84	507			505	
11/12/2007	432	75	507			510	
11/13/2007	386	74	460			497	
11/14/2007	634	85	719			517	
11/15/2007	627	123	750			552	
11/16/2007	1260	164	1424			695	
11/17/2007	1990	149	2139			929	
11/18/2007	2430	134	2564			1,223	
11/19/2007	2100	119	2219			1,468	
11/20/2007	1450	107	1557			1,625	
11/21/2007	1070	99	1169			1,689	
11/22/2007	914	98	1012			1,726	
11/23/2007	749	94	843			1,643	
11/24/2007	759	94	853			1,460	
11/25/2007	500	91	591			1,178	
11/26/2007	2060	212	2272			1,185	
11/27/2007	3530	0	3530			1,467	
11/28/2007	5470	0	5470			2,082	
11/29/2007	4690	773	5463			2,717	
11/30/2007	3430	533	3963			3,163	
12/1/2007	2480	388	2868			3,451	
12/2/2007	2030	319	2349			3,702	
12/3/2007	2790	924	3714			3,908	
	min daily flow		88	cfs	Min 7 day avg	104	cfs
			56.87	mgd		67.40	mgd

KENTUCKY-AMERICAN WATER COMPANY
CASE NO. 2007-00134

HEARING DATA REQUESTS TO KENTUCKY AMERICAN WATER
Item 6 of 15

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6. Provide a copy of any geotechnical studies or reviews of the proposed pipeline route performed by or for you.

Response:

Refer to the attached letter from Qore Property Sciences, dated April 27, 2007, titled *Summary of Drilling Services and Laboratory Testing KAWC 42-Inch Water Line*, and letter from Thelen Associates, Inc, dated August 3, 2007, titled *Geotechnical Consulting Services KAW 42-Inch Water Main.*

QORE
PROPERTY SCIENCES

B

April 27, 2007

Mr. Brent Tippey, P.E.
HDR/Quest
2517 Sir Barton Way
Lexington, Kentucky 40509

Subject: **Summary of Drilling Services and Laboratory Testing**
KAWC 42-INCH WATER LINE
Fayette, Scott and Franklin Counties, Kentucky
QORE Project No. 24304536

Dear Mr. Tippey:

QORE, Inc. has completed the drilling services and laboratory testing for the Contract B portion of the proposed 42-inch water line for Kentucky American Water Company through Fayette, Scott and Franklin Counties, Kentucky.

Per our proposal, QORE completed the original 30 borings with 5 feet of rock core within the allotted 8 days. Since an additional day of drilling was available, QORE performed 4 additional borings at the Ironworks Pike/Interstate 75 interchange. QORE also performed laboratory testing on selected soil samples to measure the resistivity, pH, chlorides and sulfates. Unconfined compressive strength tests were also performed on selected rock core samples. A Summary of Laboratory Test Data is attached.

Subsurface Logs with the latitude and longitude of the boring location are included for your use. Also included are Boring Location Plans overlaid on USGS Topographic Maps, USGS Geologic Quadrangle Maps, USDA Soil Survey Maps and USDA Farm Service Agency aerial photographs. Legends for the Geologic Quadrangle and Soil Survey Maps are also included.

13005 Middletown Industrial Blvd. Suite D Louisville, Kentucky 40223 (502) 244-3848 fax (502) 244-3580

The Loradale/Lowell, McAfee, and Maury soils typically display a gradual transition from low to high plasticity clay with depth. The consistency of these soils also tends to increase from firm to stiff with depth corresponding with the transition in soil type. For the purpose of the E' calculation, transition from firm lean clay (CL) to stiff fat clay (CH) should be estimated at 2 feet below the ground surface.

QORE appreciates the opportunity to be of service to HDR/Quest and the Kentucky American Water Company. If you have any questions concerning this project, please contact us.

Sincerely,

QORE, Inc.

Andrew M. Fiehler, P.E.
Project Engineer

Craig S. Lee, P.E.
Senior Geotechnical Engineer

Enclosures:
Subsurface Logs (34 pages)
Summary of Laboratory Test Data (5 pages)
Boring Location Plan – Topographic Map (3 pages)
Boring Location Plan – Geologic Quadrangle (5 pages)
Boring Location Plan – Soil Survey (8 pages)
Boring Location Plan – Aerial Photographs (3 pages)

Core Offset Information
High Service Main Project
Contract B
Kentucky American Water
July 2007

Core Identification	Approximate Station on Drawings	Additional Description
B30	57+00	East R/w
B29	84+35	East R/w
B28	108+00	Offset 350' west to drainage area
B27	123+00	US 460 R/W North
B26	148+25	US 460 R/W North
B25	186+10	US 460 R/W North
B24	217+20	US 460 North Lane
B23	247+50	US 460 South R/W
B22	284+75	Ironworks South R/W
B21	317+80	Ironworks South R/W
B20	360+50	
B19	380+00	
B18	413+45	
B17	443+25	
B16	465+40	
B15	491+50	
B14	509+90	
B13	552+20	
B12	589+50	
B11	623+50	
B10	651+10	
B9	687+20	
B8	706+50	
B7	743+00	
B6	777+00	
B6D	798+00	I-75 South Ramp Shoulder
B6C	801+00	Median I-75
B6B	804+00	Median I-75
B6A	808+70	Median I-75
B5	819+00	Ironworks South R/W
B4	855+00	Ironworks South R/W
B3	877+00	North Lane Ironworks
B2	913+00	North Lane Ironworks
B1	943+00	Southwest corner Newtown/Ironworks Intersection

SUMMARY OF LABORATORY TEST DATA
PAGE 1 OF 5

BORING NO.	SAMPLE DEPTH, FT.	SAMPLE TYPE*	USCS	NATURAL MOISTURE CONTENT, PERCENT	Water Soluble Sulfate Ion mg/kg, ppm	Water Soluble Chloride Ion, mg/kg, ppm	UNIT WEIGHT PCF		UNCONFINED COMPRESSIVE STRENGTH PSI	%FINER NO. 200	RESISTIVITY OH-CM	pH
							WET	DRY				
BB-1	8.8-9.4	CORE						166.7	4037			
BB-1		BG		24.9	75	75					1450	8.1
BB-2	9.8-10.4	CORE						165.2	4615			
BB-2		BG		26.1	209	110					1400	7.8
BB-3	10.5-11.0	CORE						164.6	7652			
BB-3		BG		24.8	43	45					2100	7.9
BB-4	8.8-9.5	CORE						166.8	6717			
BB-4		BG		24.1	924	329					900	7.3
BB-5	7.2-7.7	CORE						163.0	4317			
BB-5		BG		29.3	176	617					700	7.7
BB-6	8.3-9.0	CORE						163.1	6134			
BB-6		BG		9.5	175	<10					3900	7.9
BB-6A	5.8-6.2	CORE						166.9	7012			
BB-6B	8.5-9.0	CORE						168.2	4810			

*Table Checked By:*_____

* SS = Split-Spoon Sample (ASTM D 1586); UD = Undisturbed Sample (ASTM D 1587); BG = Bulk Bag Sample; CORE = Rock Core

QORE, INC.
Lexington, Kentucky
Project Name: KAWC 42 inch Waterline
Project Number: 24304536

SUMMARY OF LABORATORY TEST DATA

BORING NO.	SAMPLE DEPTH, FT.	SAMPLE TYPE*	USCS	NATURAL MOISTURE CONTENT, PERCENT	Water Soluble Sulfate Ion mg/kg, ppm	Water Soluble Chloride Ion, mg/kg, ppm	UNIT WEIGHT PCF		UNCONFINED COMPRESSIVE STRENGTH PSI	%FINER NO. 200	RESISTIVITY OH-CM	pH
							WET	DRY				
BB-6C	8.0-8.5	CORE						163.3	4220			
BB-6D	8.5-9.0	CORE						167.3	8280			
BB-7	8.0-8.7	CORE						161.8	3890			
BB-7		BG		26.0	<10	105					1700	7.8
BB-8	8.7-9.3	CORE						166.2	5449			
BB-8		BG		36.0	98	80					1150	7.6
BB-9	11.5-12.0	CORE						166.5	4772			
BB-9		BG		24.8	78	174					1700	7.8
BB-10	11.5-12.0	CORE						159.1	3848			
BB-10		BG		23.5	175	259					1300	7.9
BB-11	6.9-7.5	CORE						163.6	5224			
BB-11		BG		32.9	16	19					2100	7.1

Table Checked By: _____

* SS = Split-Spoon Sample (ASTM D 1586); UD = Undisturbed Sample (ASTM D 1587); BG = Bulk Bag Sample; CORE = Rock Core

QORE, INC.
Lexington, Kentucky
Project Name: KAWC 42 inch Waterline
Project Number: 24304536

SUMMARY OF LABORATORY TEST DATA

BORING NO.	SAMPLE DEPTH, FT.	SAMPLE TYPE*	USCS	NATURAL MOISTURE CONTENT, PERCENT	Water Soluble Sulfate Ion mg/kg, ppm	Water Soluble Chloride Ion, mg/kg, ppm	UNIT WEIGHT PCF		UNCONFINED COMPRESSIVE STRENGTH KSF	%FINER NO. 200	RESISTIVITY OHM-CM	pH
							WET	DRY				
BB-12	12.0-12.7	CORE						160.1	4042			
BB-12		BG		23.3	281	225					1200	6.8
BB-13	15.1-15.7	CORE						166.9	8273			
BB-13		BG		23.3	136	288					1200	7.3
BB-14	13.1-13.7	CORE						167.3	3212			
BB-14		BG		27.1	138	58					1300	7.1
BB-15	10.0-10.5	CORE						166.9	5785			
BB-15		BG		28.9	117	214					1100	7.2
BB-16	8.2-8.8	CORE						168.3	5496			
BB-16		BG		27.0	60	75					1300	7.5
BB-17	9.5-10.0	CORE						160.5	6239			
BB-17		BG		25.4	38	30					2700	7.2
BB-18	93.0	CORE						166.7	5163			
BB-18		BG		23.2	112	210					1000	7.2

Table Checked By: _____

* *SS = Split-Spoon Sample* (ASTM D 1586); UD = Undisturbed Sample (ASTM D 1587); BG = Bulk Bag Sample; CORE = Rock Core

QORE, INC.
Lexington, Kentucky
Project Name: *KAWC 42 inch Waterline*
Project Number: *24304536*

SUMMARY OF LABORATORY TEST DATA
PAGE 4 OF 5

BORING NO.	SAMPLE DEPTH, FT.	SAMPLE TYPE*	USCS	NATURAL MOISTURE CONTENT, PERCENT	Water Soluble Sulfate Ion mg/kg, ppm	Water Soluble Chloride Ion, mg/kg, ppm	UNIT WEIGHT PCF		UNCONFINED COMPRESSIVE STRENGTH KSF	%FINER NO. 200	RESISTIVITY OHM-CM	pH
							WET	DRY				
BB-19	13.0-13.5	CORE						166.5	5200			
BB-19		BG		27.5	65	139					1700	7.8
BB-20	15.2-15.7	CORE						166.6	6784			
BB-20		BG		15.7	244	70					1300	6.9
BB-21	13.0-13.4	CORE						167.4	5945			
BB-21		BG		17.9	69	50					1100	7.8
BB-22	16.0-16.5	CORE						162.7	6580			
BB-22		BG		20.0	235	70					890	7.5
BB-23	15.7-16.2	CORE						167.6	7273			
BB-23		BG		24.1	84	174					835	6.9
BB-24	11.0-11.5	CORE						165.2	5851			
BB-24		BG		25.6	126	224					830	6.9
BB-25		CORE						167.0	9204			
BB-25		BG		26.3	98	538					600	6.6

*Table Checked By:*_____

* SS = Split-Spoon Sample (ASTM D 1586); UD = Undisturbed Sample (ASTM D 1587); BG = Bulk Bag Sample; CORE = Rock Core

QORE, INC.
Lexington, Kentucky
Project Name: KAWC 42 inch Waterline
Project Number: 24304536

SUMMARY OF LABORATORY TEST DATA
PAGE 5 OF 5

BORING NO.	SAMPLE DEPTH, FT.	SAMPLE TYPE*	USCS	NATURAL MOISTURE CONTENT, PERCENT	Water Soluble Sulfate Ion mg/kg, ppm	Water Soluble Chloride Ion, mg/kg, ppm	UNIT WEIGHT PCF		UNCONFINED COMPRESSIVE STRENGTH KSF	%FINER NO. 200	RESISTIVITY OHM-CM	pH
							WET	DRY				
BB-26	14.1-14.6	CORE						162.9	6234			
BB-26		BG		25.6	108	309					1500	6.8
BB-27	10.0-10.5	CORE						165.5	4416			
BB-27		BG		21.8	58	164					1700	7.1
BB-28	2.3-2.8	CORE						166.3	3752			
BB-28	6.7-7.2	CORE						160.5	2977			
BB-29		BG		22.6	66	144					1900	7.3
BB-30	15.5-16.0	CORE						167.9	6242			
BB-30		BG		26.4	25	35					1100	7.0

*Table Checked By:*_____

* SS = Split-Spoon Sample (ASTM D 1586); UD = Undisturbed Sample (ASTM D 1587); BG = Bulk Bag Sample; CORE = Rock Core

QORE, INC.
Lexington, Kentucky
Project Name: KAWC 42 inch Waterline
Project Number: 24304536

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SUBSURFACE LOG

County	Fayette	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.13205 W 84.48725		
Hole Number	BB-1	Total Depth	12.8 Ft.
Started Date	03/20/07	Date Completed	03/20/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description	Sample No.	Depth	Rec. (Ft.)	SPT Blows	Sample Type	Remarks
		Overburden						
		Rock Core	RQD	Run	Rec. (Ft.)	Rec. (%)	Compression Test	
	7.8	Loradale Silt Loam/ Maury Silt Loam (LoB/MIB), Lean to Fat Clay (CL-CH), FIRM to STIFF Begin Core						
	12.8	Limestone gray medium Crystalline, fossiliferious w shale laminations Ordovician Tanglewood Formation	48	5.0	4.9	98	8.8-9.4 4037 psi	
		End Core Top of Rock 7.9' Bottom of Weathered Rock 7.9'						

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SUBSURFACE LOG

County	Fayette	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.13525 W 84.49704
Hole Number	BB-2
Total Depth	12.5 Ft.
Started Date	03/20/07
Date Completed	03/20/07
Depth to Water Immediate	Dry
Depth to Water	N/A
Date	
Driller	Sparks/Campbell
Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Overburden						
	7.5	*Loradale Silt Loam (LoB), Lean to Fat Clay (CL-CH), FIRM to STIFF*						
		Begin Core						
		Limestone gray fossilferious and argillaceous Ordovician Tanglewood Formation	*60*	*1.5*	*1.4*	*93*		*9.0*
	12.5		*83*	*3.5*	*3.5*	*100*	*9.8-10.4 4615 psi*	
		End Core						
		Top of Rock 7.8'						
		Bottom of Weathered Rock 7.8'						

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SUBSURFACE LOG

County	Fayette	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.13911 W 84.50861		
Hole Number	BB-3	Total Depth	14.7 Ft.
Started Date	03/20/07	Date Completed	03/20/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description (Overburden / Rock Core)	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Huntington Silt Loam/ Donerail Silt Loam (Hu/DoB), Lean to Fat Clay (CL-CH), FIRM to STIFF						
	10.2	Begin Core						
	14.7	Limestone gray medium Crystalline, fossilferious w shale laminations Ordovician Tanglewood Formation	24	4.5	3.7	82	10.5-11.0 7652 psi	
		End Core						
		Top of Rock 10.3'						
		Bottom of Weathered Rock 11.5'						

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SUBSURFACE LOG

County	Fayette	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.14169 W 84.51559
Hole Number	BB-4
Total Depth	10.4 Ft.
Started Date	03/20/07
Date Completed	03/20/07
Depth to Water Immediate	N/A
Depth to Water	
Date	
Driller	Sparks/Campbell
Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description (Overburden / Rock Core)	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
	5.5	Armour Silt Loam (ArA), Lean to Fat Clay (CL-CH), FIRM to STIFF Begin Core						
	10.5	Limestone gray medium Crystalline, fossilferious w shale laminations Ordovician Tanglewood Formation	0 33	2.0 3.0	1.5 2.5	75 83	 8.8-9.5' 6717 psi	7.5
		End Core Top of Rock 6.0' Bottom of Weathered Rock 6.0'						

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SUBSURFACE LOG

County	Fayette	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.14604 W 84.52672
Hole Number	BB-5 Total Depth 10.4 Ft.
Started Date	03/20/07 Date Completed 03/20/07
Depth to Water Immediate	Dry
Depth to Water	N/A Date
Driller	Sparks/Campbell Geologist R. Wilson

Lithology Elevation	Lithology Depth	Description (Overburden / Rock Core)	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Maury Silt Loam (MIB), Lean to Fat Clay (CL-CH), FIRM to STIFF						
	5.2	*Begin Core*						
		Limestone gray medium Crystalline, fossilferious w shale laminations						*Lost Water 7.0*
	10.2	*Ordovician Tanglewood Formation(Fossil Zone)*	*21*	*5.0*	*5.0*	*100*	*7.2-7.7 4317 psi*	
		End Core						
		Top of Rock 5.2'						
		Bottom of Weathered Rock 5.7'						

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SUBSURFACE LOG

County	Fayette	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.45085 W 84.53877		
Hole Number	BB-6	Total Depth	9.0 Ft.
Started Date	03/21/07	Date Completed	03/21/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description	Sample No.	Depth	Rec. (Ft.)	SPT Blows	Sample Type	Remarks
		Overburden						
		Maury Silt Loam (MlB), Lean to Fat Clay (CL-CH), FIRM to STIFF						
	4.0	Begin Core						
		Rock Core	RQD	Run	Rec. (Ft.)	Rec. (%)	Compression Test	
	9.0	Limestone gray medium Crystalline, fossilferious w shale laminations Ordovician Tanglewood Formation(Fossil Zone)	28	5.0	2.8	56	8.3-9.0 6134 psi	Lost Water 7.0
		End Core						
		Top of Rock 6.8'						
		Bottom of Weathered Rock 7.0'						

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SUBSURFACE LOG

County	Fayette	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.14800 W 84.52896		
Hole Number	BB-6A	Total Depth	10.0 Ft.
Started Date	04/25/07	Date Completed	04/25/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description (Overburden / Rock Core)	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
	5.0	Donerail Silt Loam (DoB), Lean to Fat Clay (CL-CH), FIRM to STIFF Begin Core						
	10.0	Limestone gray medium Crystalline, fossilferious w shale laminations Ordovician Tanglewood Formation	36	5.0	4.8	96	5.8 - 6.2 7012 psi	
		End Core Top of Rock 10.2' Bottom of Weathered Rock 10.2'						

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SUBSURFACE LOG

County	Fayette	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.14875 W 84.53023		
Hole Number	BB-6B	Total Depth	12.0 Ft.
Started Date	04/25/07	Date Completed	04/25/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description (Overburden / Rock Core)	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Maury Silt Loam (MIB), Lean to Fat Clay (CL-CH), FIRM to STIFF						
	7.0	Begin Core						
		Limestone gray medium Crystalline, fossiliferious w shale laminations and numerous mud seams Ordovician Tanglewood Formation	8	5.0	4.3	86	8.5 - 9.0 4810 psi	
	12.0	End Core						
		Top of Rock 7.7'						
		Bottom of Weathered Rock 11.2'						

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SUBSURFACE LOG

County	Fayette	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.14869 W 84.53128		
Hole Number	BB-6C	Total Depth	8.5 Ft.
Started Date	04/25/07	Date Completed	04/25/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description (Overburden / Rock Core)	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
	3.5	Maury Silt Loam (MlB), Lean to Fat Clay (CL-CH), FIRM to STIFF Begin Core						
	8.5	Limestone gray medium Crystalline, fossilferious w shale laminations Ordovician Tanglewood Formation	28	5.0	5.0	100	8.0-8.5 4220 psi	
		End Core Top of Rock 3.5' Bottom of Weathered Rock 3.9'						

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SUBSURFACE LOG

County	Fayette	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.14900 W 84.53218		
Hole Number	BB-6D	Total Depth	12.5 Ft.
Started Date	04/25/07	Date Completed	04/25/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description (Overburden / Rock Core)	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Maury Silt Loam (MlB), Lean to Fat Clay (CL-CH), FIRM to STIFF						
	7.5	*Begin Core*						
	12.5	*Limestone gray medium Crystalline, fossilferious w shale laminations Ordovician Tanglewood Formation*	78	5.0	5.0	100	8.5-9.0 8280 psi	
		End Core						
		Top of Rock 7.5'						
		Bottom of Weathered Rock 8.2'						

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SUBSURFACE LOG

County	Fayette	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.15493 W 84.54937		
Hole Number	BB-7	Total Depth	10.7 Ft.
Started Date	03/21/07	Date Completed	03/21/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description (Overburden / Rock Core)	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Maury Silt Loam (MaB), Lean to Fat Clay (CL-CH), FIRM to STIFF						
	5.7	Begin Core						
		Limestone gray medium Crystalline, fossiliferious w shale laminations	76	5.0	5.0	100		
	10.7	Ordovician Tanglewood Formation					8.0-8.7' 3890 psi	
		End Core						
		Top of Rock 5.7'						
		Bottom of Weathered Rock 5.7'						

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SUBSURFACE LOG

County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N38.18561 W84.56081
Hole Number	BB-8
Total Depth	10.7 Ft.
Started Date	03/21/07
Date Completed	03/21/07
Depth to Water Immediate	Dry
Depth to Water	N/A
Date	
Driller	Sparks/Campbell
Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Overburden						
	5.7	7.5" Pavement Thickness Maury Silt Loam (MaB), Lean to Fat Clay (CL-CH), FIRM to STIFF Begin Core						
	10.7	Rock Core Limestone gray medium Crystalline, fossiliferious w shale laminations Ordovician Tanglewood Formation	60	5.0	5.0	100	8.7-9.3 5449 psi	6.3-6.6 Clay Shale
		End Core Top of Rock 5.7' Bottom of Weathered Rock 5.7'						

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SUBSURFACE LOG

County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.16299 W 84.57363
Hole Number	BB-9
Total Depth	14.5 Ft.
Started Date	03/21/07
Date Completed	03/21/07
Depth to Water Immediate	Dry
Depth to Water	N/A
Date	
Driller	Sparks/Campbell
Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Overburden						
	9.5	Huntington Silt Loam (Hu), Lean to Fat Clay (CL-CH), FIRM to STIFF Begin Core						
	14.5	Limestone gray fossilferious and argillaceous Ordovician Grier Formation	36	3.8	3.1	82	11.5-12.0 4772 psi	Lost Water 13.0 13.3'
			14	1.2	1.2	100		
		End Core Top of Rock 9.2' Bottom of Weathered Rock 12.0'						

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SUBSURFACE LOG

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County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.16467 W 84.57878		
Hole Number	BB-10	Total Depth	15.0 Ft.
Started Date	03/21/07	Date Completed	03/21/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description — Overburden / Rock Core	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		9" Pavement Thickness Maury Silt Loam (MaB), Lean to Fat Clay (CL-CH), FIRM to STIFF Begin Core						
	10.0							
		Limestone gray medium Crystalline, fossiliferious w shale laminations Ordovician Tanglewood Formation	30	5.0	4.1	82	11.5-12.0 3848 psi	
	15.0							
		End Core Top of Rock 10.9' Bottom of Weathered Rock 12.2'						

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SUBSURFACE LOG

County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 36.16758 W 84.58769		
Hole Number	BB-11	Total Depth	11.6 Ft.
Started Date	03/21/07	Date Completed	03/21/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description (Overburden / Rock Core)	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Maury Silt Loam (MaB), Lean to Fat Clay (CL-CH), FIRM to STIFF						
	6.6	*Begin Core*						
		Limestone gray medium Crystalline, fossilferious w shale laminations Ordovician Tanglewood Formation	16	5.0	2.2	44	6.9-7.5 5224 psi	Lost Water 9.0
	11.6	*End Core*						
		Top of Rock 9.5'						
		Bottom of Weathered Rock 10.1'						

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SUBSURFACE LOG

County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.17113 W 84.59856		
Hole Number	BB-12	Total Depth	15.0 Ft.
Started Date	03/22/07	Date Completed	03/22/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Overburden *Maury Silt Loam (MaB), Lean to Fat Clay (CL-CH), FIRM to STIFF*						
	10.0	*Begin Core*						
		Limestone gray fossiliferious and argillaceous Ordovician Tanglewood Formation	52	5.0	4.0	80	6.9-7.5 4042 psi	
	15.0	*End Core*						
		Top of Rock 11.0' *Bottom of Weathered Rock 11.0'*						

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SUBSURFACE LOG

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County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N38.17516 W84.61028		
Hole Number	BB-13	Total Depth	17.1 Ft.
Started Date	03/22/07	Date Completed	03/22/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description	Sample No.	Depth	Rec. (Ft.)	SPT Blows	Sample Type	Remarks
		Overburden						
		Rock Core	RQD	Run	Rec. (Ft.)	Rec. (%)	Compression Test	
		14" pavement thickness						
		Maury Silt Loam (MaB), Lean to Fat Clay (CL-CH), FIRM to STIFF						
	12.1	*Begin Core*						
		Limestone gray fossilferious and argillaceous Ordovician Tanglewood Formation	*76*	*5.0*	*5.0*	*100*	*15.1-15.7 8273 psi*	
	17.1							
		End Core						
		Top of Rock 12.1'						
		Bottom of Weathered Rock 12.1'						

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County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N38.17970 W84.62396
Hole Number	BB-14
Total Depth	16.1 Ft.
Started Date	03/22/07
Date Completed	03/22/07
Depth to Water Immediate	Dry
Depth to Water	N/A
Date	
Driller	Sparks/Campbell
Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description	Sample No.	Depth	Rec. (Ft.)	SPT Blows	Sample Type	Remarks
		Overburden						
		Rock Core	RQD	Run	Rec. (Ft.)	Rec. (%)	Compression Test	
		13" Pavement Thickness Lowell Silt Loam (LoB), Lean to Fat Clay (CL-CH), FIRM to STIFF Begin Core						
	11.1							
		Limestone gray medium Crystalline, fossiliferious w shale laminations Ordovician Millersburg Formation	30	5.0	5.0	100	13.1-13.7 3212 psi	
	16.1							
		End Core Top of Rock 11.1' Bottom of Weathered Rock 11.1'						

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County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.18099 W 84.62996		
Hole Number	BB-15	Total Depth	14.0 Ft.
Started Date	03/22/07	Date Completed	03/22/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Overburden						
		14" Pavement Thickness						
		Newark Silt Loam (Ne), Lean to Fat Clay (CL-CH), FIRM to STIFF						
	9.0	*Begin Core*						
		Limestone gray fossiliferious and argillaceous Ordovician Tanglewood Formation	42	5.0	4.9	98	10.0-10.5 5785 psi	
	14.0	*End Core*						
		Top of Rock 9.1'						
		Bottom of Weathered Rock 9.1'						

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County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.18347 W 84.63825		
Hole Number	BB-16	Total Depth	9.2 Ft.
Started Date	03/22/07	Date Completed	03/22/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description (Overburden / Rock Core)	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
	1.2	15" Pavement						
	4.2	Newark Silt Loam (Ne), Lean to Fat Clay (CL-CH), FIRM to STIFF Begin Core						
	9.2	Limestone gray fossiliferious and argillaceous Ordovician Tanglewood Formation Fossil Zone	40	5.0	4.2	84	8.2-8.8 5496 psi	
		End Core						
		Top of Rock 5.0'						
		Bottom of Weathered Rock 5.9'						

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County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.18564 W 84.64548
Hole Number	BB-17
Total Depth	11.5 Ft.
Started Date	03/22/07
Date Completed	03/22/07
Depth to Water Immediate	Dry
Depth to Water	N/A
Date	
Driller	Sparks/Campbell
Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Overburden						
	6.5	11" Pavement Thickness Maury Silt Loam (MaB), Lean to Fat Clay (CL-CH), FIRM to STIFF Begin Core						
	11.5	Rock Core Limestone gray medium Crystalline, fossiliferious w shale laminations Ordovician Tanglewood Formation	20	5.0	4.2	84	9.5-10 6239 psi	
		End Core Top of Rock 7.3' Bottom of Weathered Rock 7.3'						

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SUBSURFACE LOG

County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.18855 W 84.65518		
Hole Number	BB-18	Total Depth	12.2 Ft.
Started Date	03/22/07	Date Completed	03/22/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description: Overburden / Rock Core	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		11" Pavement Thickness Maury Silt Loam (MaB), Fat Clay (CH), FIRM to STIFF						
	7.2	Begin Core						
		Limestone gray medium Crystalline, fossilferious w shale laminations Ordovician Millersburg Formation	42	5.0	5.0	100	9.8-10.4 5163 psi	
	12.2	End Core						
		Top of Rock 7.2'						
		Bottom of Weathered Rock 8.7'						

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SUBSURFACE LOG

County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.191611 W 84.665917		
Hole Number	BB-19	Total Depth	16.0 Ft.
Started Date	04/05/07	Date Completed	04/05/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description (Overburden / Rock Core)	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Huntington Silt Loam (Hu), Lean to Fat Clay (CL-CH), FIRM to STIFF						
		Begin Core						
	11.0	Limestone gray medium Crystalline, fossiliferious w shale laminations Ordovician Tanglewood Formation	8	5.0	4.6	92	13.0-13.5 5200 psi	Lost Water 13.0
	16.0	End Core						
		Top of Rock 11.0'						
		Bottom of Weathered Rock 13.6'						

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SUBSURFACE LOG

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County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N38.19380 W84.67233		
Hole Number	BB-20	Total Depth	17.2 Ft.
Started Date	04/09/07	Date Completed	04/09/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description — Overburden / Rock Core	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Nicholson Silt Loam (NfB), Lean Clay (CL), FIRM to STIFF						
	12.2	Begin Core						
		Limestone gray fossiliferious and argillaceous Ordovician Millersburg Formation	17	5.0	4.2	84	15.2-15.7 6784 psi	
	17.2							
		End Core						
		Top of Rock 13.0'						
		Bottom of Weathered Rock 13.2'						

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County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N38.19822 W84.68602		
Hole Number	BB-21	Total Depth	16.5 Ft.
Started Date	04/09/07	Date Completed	04/09/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description (Overburden / Rock Core)	Sample No.	Depth	Rec. (Ft.)	SPT Blows	Sample Type	Remarks
		Lowell Silt Loam (LoB), Lean to Fat Clay (CL-CH), FIRM to STIFF						
		Begin Core						
	11.5	*Limestone gray fossilferious and argillaceous Ordovician Tanglewood Formation*	18	5.0	4.5	90	13.0-13.4 5945 psi	
	16.5	*End Core*						
		Top of Rock 12.0'						
		Bottom of Weathered Rock 12.0						

Sample Type	Rec. (%)	Compression Test
	RQD	Run

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County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N38.20175 W84.69658		
Hole Number	BB-22	Total Depth	17.5 Ft.
Started Date	04/09/07	Date Completed	04/09/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description: Overburden / Rock Core	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Lowell Silt Loam (LoC), Lean to Fat Clay (CL-CH), FIRM to STIFF						
	12.5	Begin Core						
	17.4	Limestone gray fossliferious and argillaceous Ordovician Millersburg Formation	60	5.0	4.5	90	16.0-16.5 6580 psi	
		End Core						
		Top of Rock 12.5'						
		Bottom of Weathered Rock 12.5						

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SUBSURFACE LOG

County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	US460		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N38.20744 W84.70561		
Hole Number	BB-23	Total Depth	17.4 Ft.
Started Date	04/10/07	Date Completed	04/10/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Overburden						
		Maury Silt Loam (MaC), Lean to Fat Clay (CL-CH), FIRM to STIFF						
	12.4	*Begin Core*						
		Rock Core						
		Limestone gray fossilferious and argillaceous Ordovician Millersburg Formation	*24*	*5.0*	*4.5*	*90*	*15.7-16.2 7273 psi*	
	17.4							
		End Core						
		Top of Rock 12.9'						
		Bottom of Weathered Rock 12.9						

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SUBSURFACE LOG

County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N38.20777 W84.71550		
Hole Number	BB-24	Total Depth	13.5 Ft.
Started Date	04/10/07	Date Completed	04/10/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description (Overburden / Rock Core)	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Maury Silt Loam (MaB), Lean to Fat Clay (CL-CH), FIRM to STIFF						
	8.5	*Begin Core*						
	13.5	*Limestone gray medium Crystalline, fossilferious w shale laminations Ordovician Tanglewood Formation*	*28*	*5.0*	*4.6*	*92*	*11.0-11.5 5851 psi*	
		End Core						
		Top of Rock 8.9'						
		Bottom of Weathered Rock 8.9'						

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SUBSURFACE LOG

County	Scott	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N38.20822 W84.72602		
Hole Number	BB-25	Total Depth	12.0 Ft.
Started Date	04/10/07	Date Completed	04/10/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description	Sample No.	Depth	Rec. (Ft.)	SPT Blows	Sample Type	Remarks
		Overburden						
		Rock Core	RQD	Run	Rec. (Ft.)	Rec. (%)	Compression Test	
	7.0	Maury Silt Loam (MaB), Lean to Fat Clay (CL-CH), FIRM to STIFF Begin Core						
	12.0	Limestone gray medium Crystalline, fossilferious w shale laminations Ordovician Tanglewood Formation	30	5.0	4.5	90	9204 psi	
		End Core Top of Rock 7.7' Bottom of Weathered Rock 8.2'						

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SUBSURFACE LOG

County	Franklin	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	KY1262		
Surface Elevation	(NA) Ft.		
Project Type	42" Inch Waterline		

Location	N38.20869 W84.73919		
Hole Number	BB-26	Total Depth	19.1 Ft.
Started Date	04/10/07	Date Completed	04/10/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description (Overburden / Rock Core)	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		McAfee Silt Loam (McD), Lean Clay (CL), FIRM to STIFF						
	14.1	*Begin Core*						
		Limestone gray medium crystalline with shale laminations and partings Ordovician Tanglewood Formation	32	5.0	4.1	82	14.1-14.6 6234 psi	
	19.1	*End Core*						
		Top of Rock 14.1'						
		Bottom of Weathered Rock 15.1'						

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SUBSURFACE LOG

County	Franklin	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	KY1262		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N38.20944 W84.74769		
Hole Number	BB-27	Total Depth	11.0 Ft.
Started Date	04/10/07	Date Completed	04/10/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Overburden						
	6.0	McAfee Silt Loam (McD), Lean Clay (CL), FIRM to STIFF Begin Core						
	11.0	Limestone gray medium crystalline with shale laminations and partings Ordovician Grier Formation	0	5.0	4.0	80	10.0-10.5 4416 psi	
		End Core Top of Rock 14.1' Bottom of Weathered Rock 15.1'						

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SUBSURFACE LOG

County	Frankin	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	Ironworks Pike		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.21079 W 84.75373		
Hole Number	BB-28	Total Depth	5.0 Ft.
Started Date	04/13/07	Date Completed	04/13/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description (Overburden / Rock Core)	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
	5.0	Limestone gray fossilferious and argillaceous Ordovician Grier Formation	38	5.0	4.9	98	2.3-2.8 3752 psi	
		End Core						
		Top of Rock 1.9'						
		Bottom of Weathered Rock2.8'						

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County	Franklin	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	KY1262		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.21655 W 84.74992
Hole Number	BB-29 Total Depth 9.7 Ft.
Started Date	04/13/07 Date Completed 04/13/07
Depth to Water Immediate	Dry
Depth to Water	N/A Date
Driller	Sparks/Campbell Geologist R. Wilson

Lithology Elevation	Lithology Depth	Description — Overburden / Rock Core	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
	4.7	Maury Silt Loam (MaC), Lean Clay (CL), FIRM to STIFF Begin Core						
	9.7	Limestone gray medium crystalline with shale laminations and partings Ordovician Tanglewood Formation	26	5.0	5.0	100	6.7-7.2 2977 psi	
		End Core Top of Rock 4.7' Bottom of Weathered Rock 5.9'						

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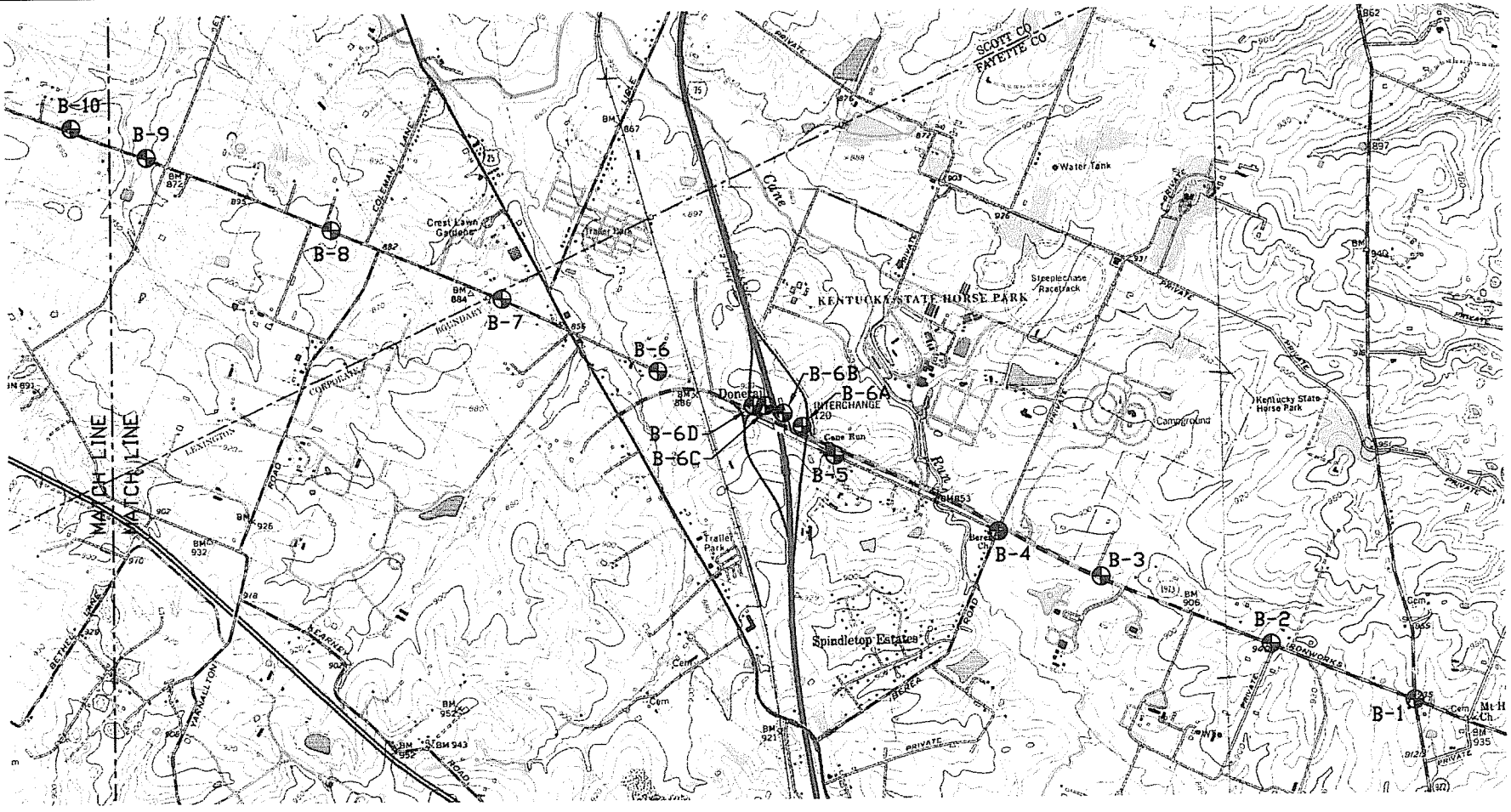
County	Franklin	Client	HDR/Quest
QORE Project No.	24304536		
Road Name	KY1262		
Surface Elevation	N/A Ft.		
Project Type	42" Inch Waterline		

Location	N 38.22356 W 84.74569		
Hole Number	BB-30	Total Depth	17.2 Ft.
Started Date	04/13/07	Date Completed	04/13/07
Depth to Water Immediate	Dry		
Depth to Water	N/A	Date	
Driller	Sparks/Campbell	Geologist	R. Wilson

Lithology Elevation	Lithology Depth	Description — Overburden / Rock Core	Sample No. / RQD	Depth / Run	Rec. (Ft.) / Rec. (Ft.)	SPT Blows / Rec. (%)	Sample Type / Compression Test	Remarks
		Lowell Silt Loam (LwB), Lean Clay (CL), FIRM to STIFF						
	12.2	*Begin Core*						
	17.2	*Limestone gray fossilferious and argillaceous Ordovician Millersburg Formation*	*20*	*5.0*	*5.0*	*100*	*15.5-16.0 6242 psi*	
		End Core						
		Top of Rock 12.2'						
		Bottom of Weathered Rock 12.2'						



TOPOGRAPHY - SHEET 1 OF 3

LEGEND
⊕ B-1 BORING LOCATION

SCALE: 1" = 2000'

0 500 1000 2000 4000

BORING LOCATION MAP

LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304536

HDR / QUEST ENGINEERS, INC.

SCALE:	1" = 2000'
DATE:	4-20-07
DRAWN BY:	JAC
CHECKED BY:	AF

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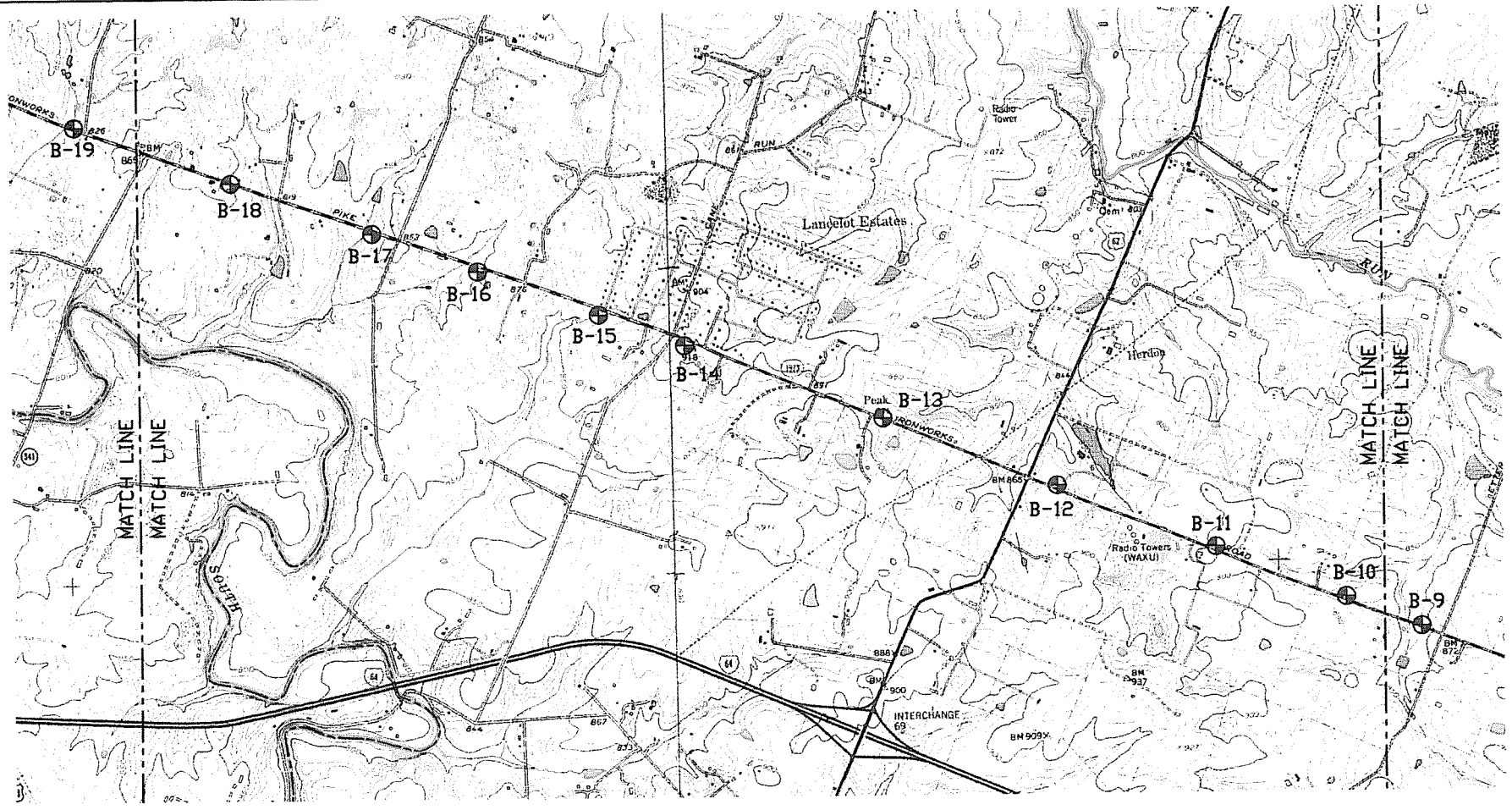
422 COGHILL DRIVE, LEXINGTON, KENTUCKY 40509
PHONE (859) 293-5518 / FAX (859) 299-7491



LEGEND
B-1 BORING LOCATION

SCALE: 1" = 2000'

0 500 1000 2000 4000

TOPOGRAPHY - SHEET 2 OF 3

BORING LOCATION MAP

LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304536

HDR / QUEST ENGINEERS, INC.

SCALE:	1" = 2000'
DATE:	4-20-07
DRAWN BY:	JAC
CHECKED BY:	AF

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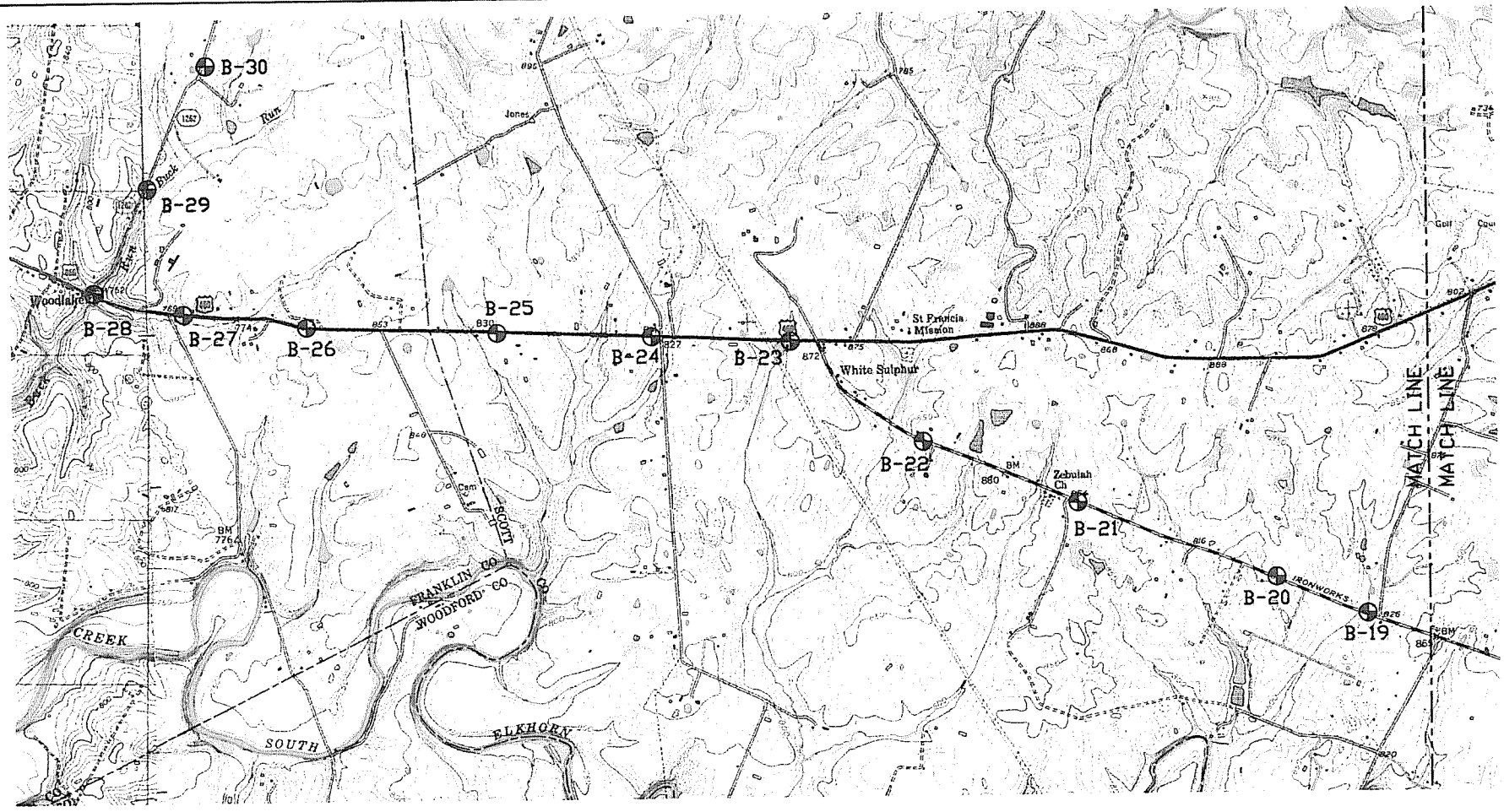

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LEGEND
⊕ B-1 BORING LOCATION

SCALE: 1" = 2000'

0 500 1000 2000 4000

BORING LOCATION MAP

LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304536

HDR / QUEST ENGINEERS, INC.

SCALE:	1" = 2000'
DATE:	4-20-07
DRAWN BY:	JAC
CHECKED BY:	AF

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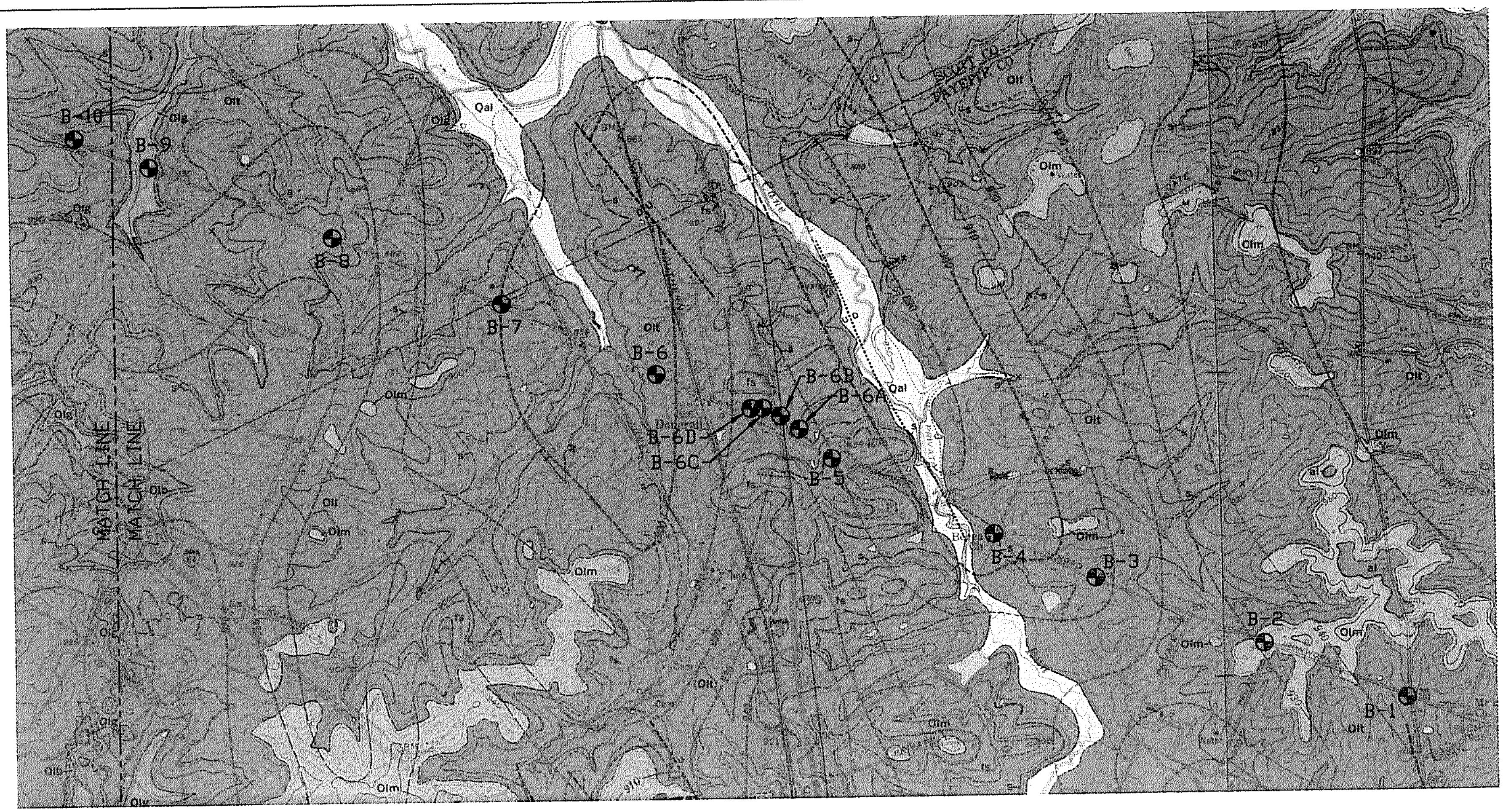

LEGEND

B-1 BORING LOCATION

SCALE: 1" = 2000'

0 500 1000 2000 4000

GEOLOGY - SHEET 1 OF 5

BORING LOCATION MAP

LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304530

HDR / QUEST ENGINEERS, INC.

SCALE:	1" = 2000'
DATE:	4-20-07
DRAWN BY:	JAC
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LEGEND
⊕ B-1 BORING LOCATION

SCALE: 1" = 2000'

0 500 1000 2000 4000

GEOLOGY - SHEET 2 OF 5

BORING LOCATION MAP

LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304535

HDR / QUEST ENGINEERS, INC.

SCALE:	1" = 2000'
DATE:	4-20-07
DRAWN BY:	JAC
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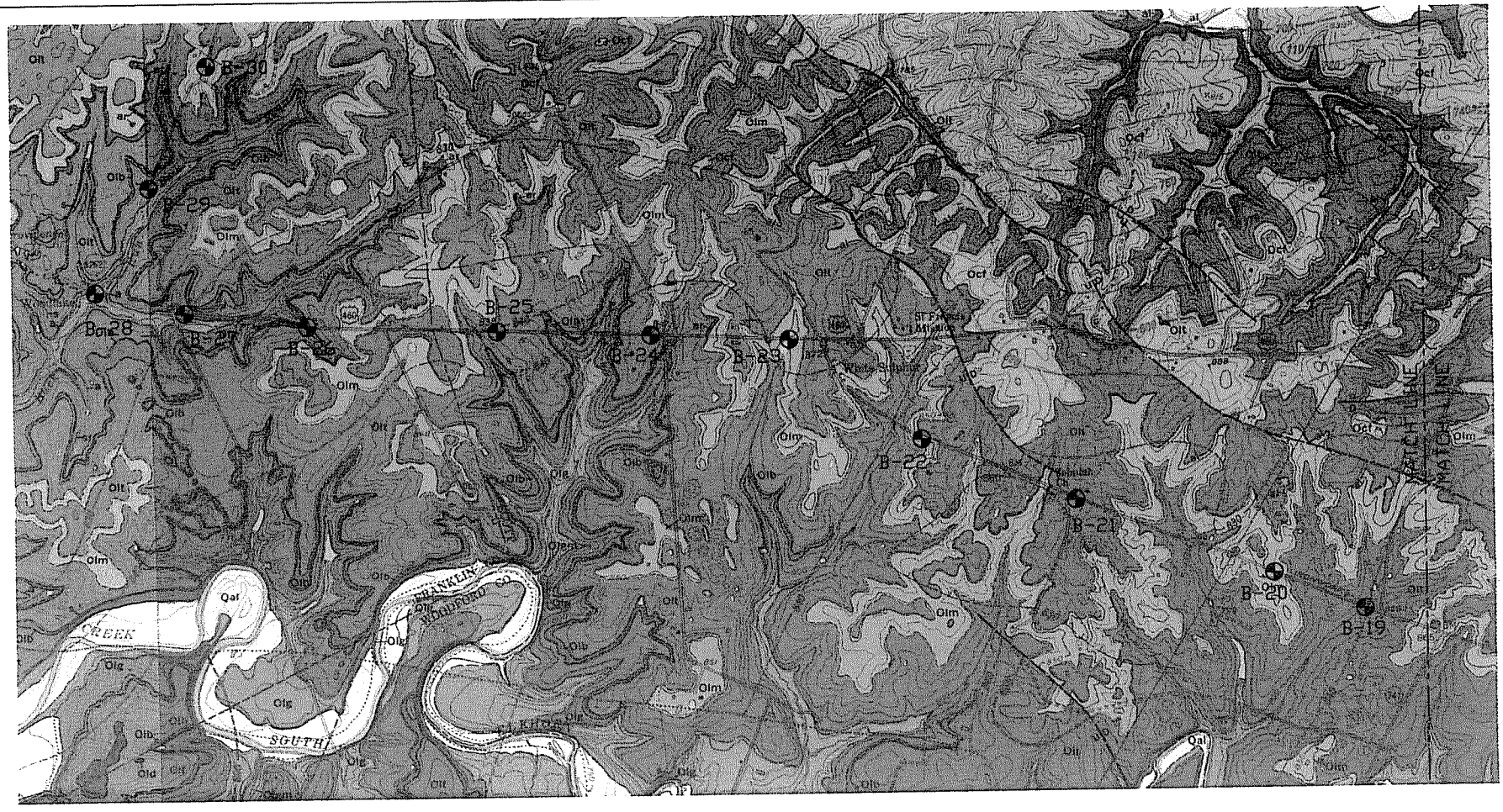

LEGEND
⊕ B-1 BORING LOCATION

SCALE: 1" = 2000'

0 500 1000 2000 4000

GEOLOGY - SHEET 3 OF 5

BORING LOCATION MAP

LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304639

HDR / QUEST ENGINEERS, INC.

SCALE:	1" = 2000'
DATE:	4-20-07
DRAWN BY:	JAC
CHECKED BY:	AF

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PHONE (859) 233-0518 / FAX (859) 233-3451

GEOLOGIC QUADRANGLE MAP

MIDWAY QUADRANGLE, KENTUCKY

GQ-856

EXPLANATION

Qal

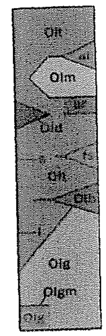
Alluvium

QUATERNARY

st
Ocf

Clays Ferry Formation

st, base of abundant siltstone
In this quadrangle the Clays Ferry Formation is of Late Ordovician age only



Lexington Limestone

Olt, *Tanglewood Limestone Member*
al, *argillaceous limestone and shale**
Olm, *Millersburg Member. (In this quadrangle the Millersburg Member is of Late Ordovician age only)*
Old, *Devils Hollow Member*
ar, *argillaceous limestone**
fs, *fossiliferous limestone and shale**
s, *top of zone of abundant stromatoporoids*
Olb, *Brannon Member**
l, *base of nodular bedded limestone*
Olg, *Grier Limestone Member*
Olgm, *base of Macedonia Bed*
*Shown by line where too thin to show color

Upper Ordovician ? Middle Ordovician

ORDOVICIAN

Contact

Dashed where approximately located; short dashed where indefinite or inferred; dotted where concealed

D
U

Fault

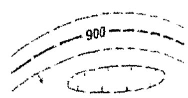
Dashed where approximately located; short dashed where inferred; dotted where concealed. U, upthrown side; D, downthrown side

2

Strike and dip of beds

Horizontal beds

Strike of vertical joints



Structure Contours

Drawn on base of Millersburg Member of Lexington Limestone in northern part of quadrangle and on base of Brannon Member of Lexington Limestone in southern part of quadrangle (locally drawn on top of Grier Limestone Member of Lexington Limestone in extreme southwest corner where Brannon Member is absent). Long dashed where control less accurate. Short dashed where datum is missing. Arrow indicates direction of dip. Hachures indicate closed basin. Contours not shown where data insufficient. Contour interval 10 feet

×

Barite float

GEOLOGY - SHEET 4 OF 5

GEOLOGIC DATA SHEET

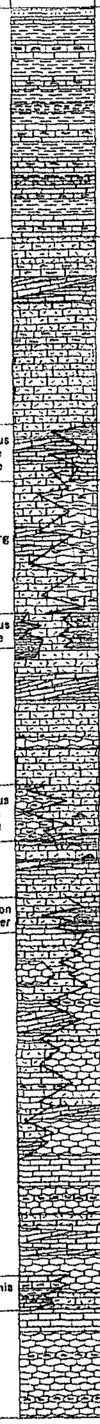
LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304536

HDR / QUEST ENGINEERS, INC.

SCALE:	NTS
DATE:	4-20-07
DRAWN BY:	JAC
CHECKED BY:	AF

QORE PROPERTY SCIENCES

SYSTEM	SERIES	FORMATION, MEMBER, AND BED	LITHOLOGY	THICKNESS, IN FEET	DESCRIPTION



ORDOVICIAN

Series: Upper O; ? ; Middle Ordovician

Formation: Lexington Limestone

Formation, Member, and Bed (top to bottom) / Thickness, in feet:

- Tanglewood Limestone Member — 30–40
- Argillaceous limestone and shale — 0–10
- Millersburg Member — 0–27
- Devils Hollow Member: Argillaceous limestone — 0–12; 0–8
- Tanglewood Limestone Member — 20–50
- Fossiliferous limestone and shale — 0–16
- Brannon Member — 0–10
- 0–45
- Grier Limestone Member — 50–66; 80+
- Macedonia Bed — 0–10
- 18+
- Lexington Limestone total: 165–210

DESCRIPTION

Limestone, medium- to medium-dark-gray to grayish-orange; weathers yellowish gray to brownish gray; medium to coarse grained, bioclastic; very thin to thin planar- to wavy-surfaced beds, partly crossbedded, *slightly phosphatic*. Commonly includes irregularly surfaced beds 0.1 to 1.0 foot thick consisting of fragments of bryozoans, *gastropods (Cyclonema sp.), and large, fine-ribbed brachiopods (Rafinesquina sp.); at least one* coquinoid bed of poorly sorted shelly material with scant matrix occurs in large graben area. Underground cavities and sinkholes common. Intertongues with argillaceous limestone and shale in northeastern quadrant and with Millersburg Member in northern part of quadrangle. Upper part may be correlative with Nicholas Limestone Member of Lexington Limestone (Black and others, 1965).

Limestone and shale: Limestone about 50 to 70 percent, medium- to light-gray, micrograined to very fine grained, generally unfossiliferous; in very thin to thin tabular or lenticular beds or in convoluted masses exhibiting ball and pillow structure. Residual chert common as float. Shale, fissile, occurs as thin interbeds; weathers yellowish gray. Unit apparently *thins westward from quadrangles* to the east (Cressman, 1967; Kanizay and Cressman, 1967); not present in western one-fourth of quadrangle. May be a tongue of Clays Ferry Formation. *Limestone with bryozoans* and brachiopods south of North Elkhorn Creek and east of major fault block near east border of quadrangle appears to be a transitional phase with underlying unit. Unit mapped as heavy line where thought to be less than 5 feet thick.

Limestone and shale: Limestone 65 to 75 percent, medium-light-gray, weathers yellowish gray; fine to coarse grained, very thin to thin irregularly bedded to nodular, profusely fossiliferous. Shale, medium- to dark-gray; weathers yellowish gray; occurs in irregular beds and as matrix surrounding limestone nodules and lenses. Brachiopods (*Rafinesquina*), bryozoans (*Constellaria*), gastropods (*Cyclonema*) are common. Unit absent south of South Elkhorn Creek. In this quadrangle the Millersburg Member is believed to be of Late Ordovician Age only.

Argillaceous limestone, medium- to dark-bluish-gray to light-brownish-gray, weathers light bluish to brownish gray; micrograined to *fine grained*, very thin to thin bedded with convolute bedding (ball and pillow structure); nonfossiliferous; interbedded with minor shale. Residual chert common as float. Sharp contacts with overlying *fossiliferous limestone and* shale of Millersburg Member and underlying granular phosphatic limestone of Tanglewood Limestone Member where well exposed. Unit crops out locally in northwestern part of quadrangle. Thought to occur as discontinuous lenses which pinch out to the east. Unit may be laterally connected to main body of Clays Ferry Formation or may be a facies of the Devils Hollow Member.

Devils Hollow Member. Limestone and shale: Limestone 70 to 95 percent, light-yellowish- and greenish-gray, cryptograined, and light- to medium-gray, coarse-grained, commonly bioclastic, coquinoid; very thin bedded to thick bedded. Shale, medium-gray, calcareous; interbedded with very fine grained limestone. Coarse-grained coquinoid limestone containing a *profusion of gastropod* shells and less common small coarsely ribbed brachiopods occurs in the vicinity of the Old Frankfort Road in the southwestern part of quadrangle. To the north along U.S. 421, *gastropodal chert chunks and micrograined* limestone fragments with ostracodes occur as float. In much of mapped area unit occurs in weathered zone near hilltops and is rarely exposed. Best exposed in area surrounding *ponds approximately* 1,000 feet north of Old Frankfort Road. Member is absent north of South Elkhorn Creek and northeast of Midway.

Tanglewood Limestone Member. Limestone, medium-gray to medium-dark-gray fine- to *coarse-grained, bioclastic, very* thin to thin planar- to wavy-surfaced beds, partly crossbedded, generally phosphatic. Locally includes convoluted beds as at Louisville and Nashville Railroad cut 1.3 miles east-southeast of Midway and in a few localities in northwest corner of quadrangle. In area north of North *Elkhorn Creek and west of Duval, upper part of unit yields abundant cherty float,* probably the product of silicification of limestone during weathering. Unit intertongues with units as shown on column. Unit interfingers with and grades into upper part of *Grier Limestone Member. Interfingering pronounced* in area just south of South Elkhorn Creek near western edge of quadrangle. Maximum thickness of lowermost tongue occurs north of South Elkhorn Creek near western *edge of quadrangle.* Unit contains a 3- to 4-foot-thick, light-grayish-blue, nodular to irregularly bedded, bioclastic sequence within 6 to 8 feet of base of Brannon Limestone Member along U.S. Highway 460 in western part of quadrangle. Fossils include small, coarsely ribbed brachiopods, bryozoans, and corals. Stromatoporoids occur locally. Underground cavaties *and sinkholes common.*

Limestone and shale: Limestone 65 to 75 percent, medium- to light-gray, weathers yellowish gray; fine to coarse grained, profusely fossiliferous with micrograined calcite matrix in very thin to thin nodular to irregular beds. *Shale, medium-* to dark-gray; weathers yellowish gray; occurs in irregular beds and as matrix surrounding limestone nodules and lenses. Small, coarsely ribbed brachiopods *are particularly abundant. Unit grades southwestward* into fine- to coarse-grained bioclastic limestone. Unit similar to Millersburg Member.

Interbedded limestone and shale: Limestone 65 to 85 percent, light-gray to medium-light-gray, micrograined to very fine grained, argillaceous, very thin to thin tabular bedded, locally convoluted (ball an pillow structure), fossils generally sparse. Residual chert common as float. Shale, *light- to dark-gray*, fissile. Maximum thickness in southeast corner of quadrangle. In area just south of major graben unit apparently intertongues with and passes laterally into fine- to coarse-grained bioclastic *limestone of Tanglewood* Limestone Member.

Limestone light- to dark-gray, micrograined to coarse-grained, but mostly medium-grained, bioclastic (mainly brachiopodal); very thin to thin *irregularly bedded to* nodular; locally slightly phosphatic. Shale partings and nodular limestone lenses common. Brachiopods and bryozoans abundant; brachiopods are similar to those identified in adjacent *quadrangles as Hebertella* sp., *Zygospira* sp., *Rhynchotrema* sp., and dalmanellids. Includes a few thin sequences of very thin to thin-bedded, partly crossbedded, slightly phosphatic limestone, especially in *western and southwestern* parts of quadrangle. Intertongues with and grades into Tanglewood Limestone Member. *Underground cavities and sinks common*

Limestone and shale: *Limestone 70 to 85 percent, medium-light-gray*, generally micrograined, mostly argillaceous, very thin to thin tabular bedded, includes several thin beds of coquinoid brachiopodal limestone. Shale, medium- to *dark-gray*, fissile. Unit present in western part of quadrangle along South Elkhorn Creek. Apparently grades into granular bioclastic limestone both to the east (Cressman, 1967) and to the west (Pomeroy, 1968).

GEOLOGY - SHEET 5 OF 5

GEOLOGIC DATA SHEET

LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304536

HDR / QUEST ENGINEERS, INC.

SCALE:	NTS
DATE:	4-20-07
DRAWN BY:	JAC
CHECKED BY:	AF

QORE PROPERTY SCIENCES
422 CODELL DRIVE, LEXINGTON, KENTUCKY 40509
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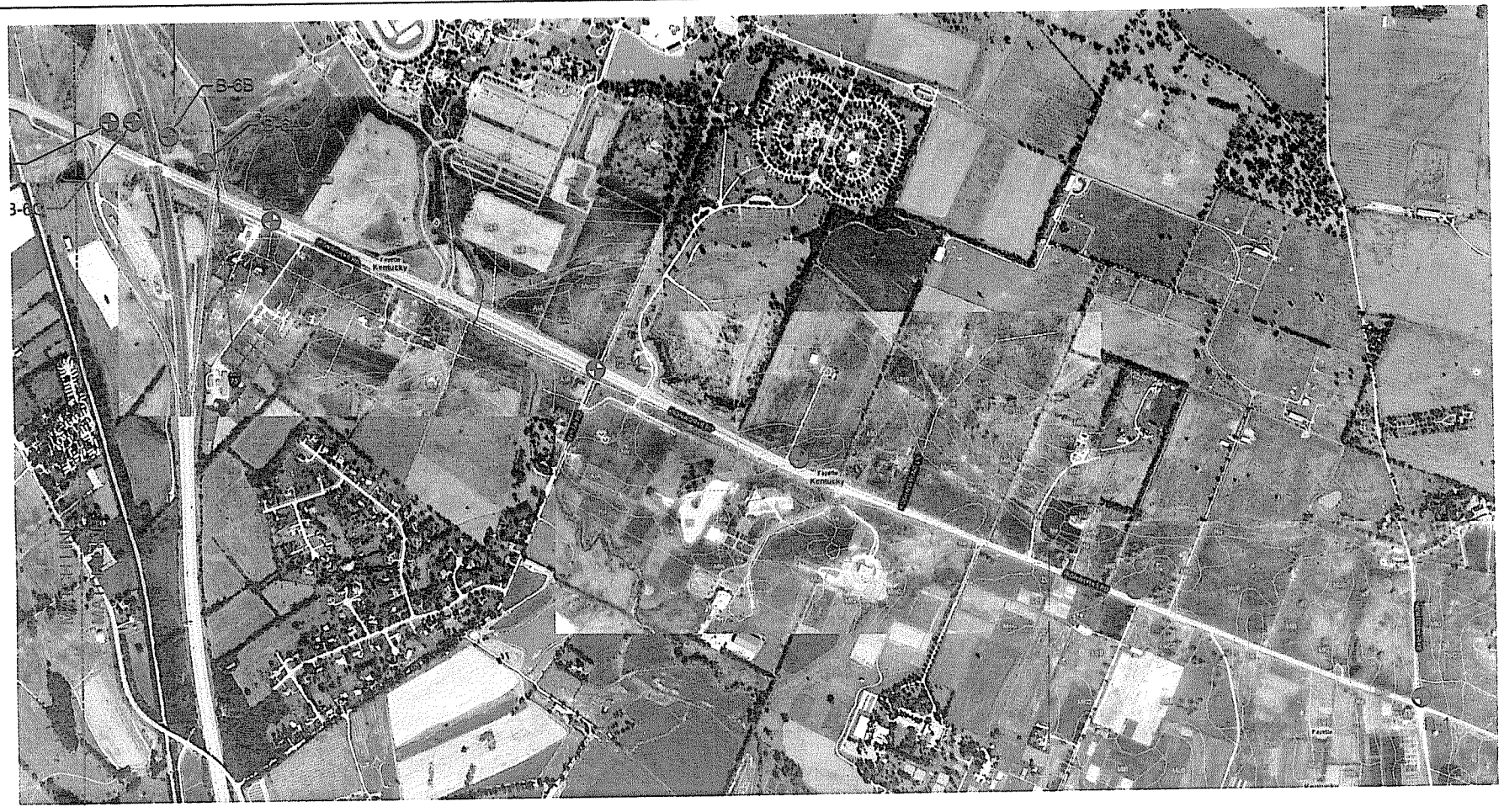

SOILS - SHEET 1 OF 8

LEGEND
⊕ B-1 BORING LOCATION

SCALE: 1" = 1000'

0 250 500 1000 2000

BORING LOCATION MAP

LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304536

HDR / QUEST ENGINEERS, INC.

SCALE:	1" = 1000'
DATE:	4-20-07
DRAWN BY:	JAC
CHECKED BY:	AF

QORE PROPERTY SCIENCES
427 GOSDELL DRIVE, LEXINGTON, KENTUCKY 40503
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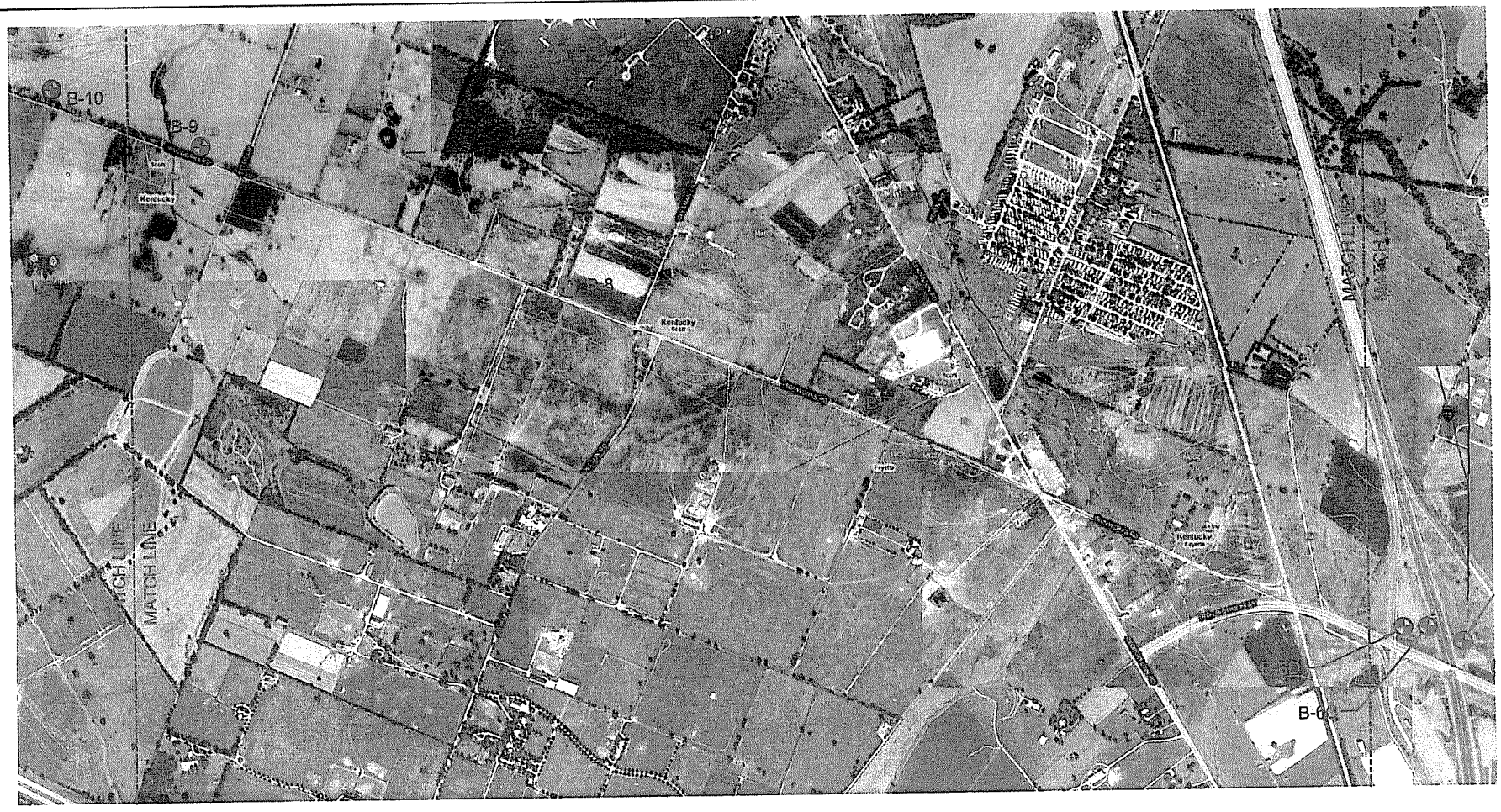

LEGEND
⊕ B-1 BORING LOCATION

SCALE: 1" = 1000'

0 250 500 1000 2000

SOILS - SHEET 2 OF 8

BORING LOCATION MAP

LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304536

HDR / QUEST ENGINEERS, INC.

SCALE:	1" = 1000'
DATE:	4-20-07
DRAWN BY:	JAC
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LEGEND
⊕ B-1 BORING LOCATION

SCALE: 1" = 1000'

0 250 500 1000 2000

SOILS - SHEET 3 OF 8

BORING LOCATION MAP

LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304536

HDR / QUEST ENGINEERS, INC.

SCALE:	1" = 1000'
DATE:	4-20-07
DRAWN BY:	JAC
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LEGEND
⊕ B-1 BORING LOCATION

SCALE: 1" = 1000'

0 250 500 1000 2000

SOILS - SHEET 4 OF 8

BORING LOCATION MAP

LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304536

HDR / QUEST ENGINEERS, INC.

SCALE:	1" = 1000'
DATE:	4-20-07
DRAWN BY:	JAC
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LEGEND
⊕ B-1 BORING LOCATION

SCALE: 1" = 1000'

0 250 500 1000 2000

SOILS - SHEET 5 OF 8

BORING LOCATION MAP

LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304536

HDR / QUEST ENGINEERS, INC.

SCALE:	1" = 1000'
DATE:	4-20-07
DRAWN BY:	JAC
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SOILS - SHEET 6 OF 8

LEGEND
⊕ B-1 BORING LOCATION

SCALE: 1" = 1000'

0 250 500 1000 2000

BORING LOCATION MAP

LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304536

HDR / QUEST ENGINEERS, INC.

SCALE:	1" = 1000'
DATE:	4-20-07
DRAWN BY:	JAC
CHECKED BY:	AF

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FAYETTE COUNTY, KETUCKY

SYMBOL	NAME
ArA	Armour silt loam
ArB	Armour silt loam, 2 to 6 percent slopes (elk)
CaA	Captina silt loam, 0 to 2 percent slopes (otwell)
CaB	Captina silt loam, 2 to 6 percent slopes (otwell)
DoA	Donerail silt loam, 0 to 2 percent slopes
DoB	Donerail silt loam, 2 to 6 percent slopes
DoC	Donerail silt loam, 6 to 12 percent slopes
Ea	Egam silt loam (woolper)
Ec	Egam silty clay loam (woolper)
Hu	Huntington silt loam
La	Lanton silty clay loam (dunning)
Lc	Lawrence silt loam
Ld	Lindside silt loam
LoB	Loradale silt loam, 2 to 6 percent slopes
LoC2	Loradale silt loam, 6 to 12 percent slopes, eroded
LwB	Lowell silt loam, 2 to 6 percent slopes
LwC2	Lowell silt loam, 6 to 12 percent slopes, eroded

FAYETTE COUNTY, KETUCKY CON'T

SYMBOL	NAME
MIA	Maury silt loam, 0 to 2 percent slopes
MIB	Maury silt loam, 2 to 6 percent slopes
MIB2	Maury silt loam, 2 to 6 percent slopes, eroded
MIC	Maury silt loam, 6 to 12 percent slopes
MIC2	Maury silt loam, 6 to 12 percent slopes, eroded
MnB	McAfee silt loam, 2 to 6 percent slopes
MnC	McAfee silt loam, 6 to 12 percent slopes
MoD3	McAfee silty clay, 12 to 20 percent slopes, severely eroded
MpC2	McAfee silty clay loam, 6 to 12 percent slopes, eroded
MpD2	McAfee silty clay loam, 12 to 20 percent slopes, eroded
MuB	Mercer silt loam, 2 to 6 percent slopes (nicholson)
MuC	Mercer silt loam, 6 to 12 percent slopes (nicholson)
MuC2	Mercer silt loam, 6 to 12 percent slopes, eroded (nicholson)
Ne	Newark silt loam
ScC2	Salvisa silty clay loam, 6 to 12 percent slopes, eroded
W	Water

SCOTT COUNTY, KETUCKY

SYMBOL	NAME
AsA	Ashton silt loam, 0 to 4 percent slopes
Du	Dunning silty clay loam, dark subsoil variant
EdD	Eden silty clay loam, 12 to 20 percent slopes
EhB	Eden and Faywood silty clay loams, 2 to 12 percent slopes
Hu	Huntington silt loam
LoB	Lowell silt loam, 2 to 6 percent slopes
LoC	Lowell silt loam, 6 to 12 percent slopes
MaB	Maury silt loam, 2 to 6 percent slopes
MaC	Maury silt loam, 6 to 12 percent slopes
McC	McAfee silt loam, 6 to 12 percent slopes
McD	McAfee silt loam, 12 to 20 percent slopes
Ne	Newark silt loam
NfB	Nicholson silt loam, 2 to 6 percent slopes
W	Water

FRANKLIN COUNTY, KETUCKY

SYMBOL	NAME
EdC	Eden silty clay loam, 6 to 15 percent slopes
FcE	Fairmount-Rock outcrop complex, 12 to 30 percent slopes
FdC	Faywood silt loam, 6 to 12 percent slopes
FdD	Faywood silt loam, 12 to 30 percent slopes
LwB	Lowell silt loam, 2 to 6 percent slopes
LwC	Lowell silt loam, 6 to 12 percent slopes
MaB	Maury silt loam, 2 to 6 percent slopes
MaC	Maury silt loam, 6 to 12 percent slopes
McB	McAfee silt loam, 2 to 6 percent slopes
McC	McAfee silt loam, 6 to 12 percent slopes
McD	McAfee silt loam, 12 to 20 percent slopes
NhB	Nicholson silt loam, 2 to 6 percent slopes
W	Water

SOILS MAP DESCRIPTION

LOCATION: GEORGETOWN, KENTUCKY | QORE PROJECT NUMBER: 24304536

HDR / QUEST ENGINEERS, INC.

SCALE: NTS
DATE: 4-20-07
DRAWN BY: JAC
CHECKED BY: AF

QORE PROPERTY SCIENCES
472 EGGERS DRIVE, LEXINGTON, KENTUCKY 40503
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TABLE 5.—*Estimated soil properties*

(An asterisk in the first column indicates that at least one mapping unit in that series is made up of two or more kinds of soil. The first column. The symbol > means *significant in engineering*

soils in such mapping units may have different properties, and for this reason it is necessary to refer to other series as indicated in more than; the symbol < means less than)

Soil series and map symbols	Depth to—		Depth from surface	USDA texture	Classification		Coarse fraction larger than 3 inches	Percentage smaller than 3 inches passing sieve—				Liquid limit [2]	Plasticity index	Permeability	Available water capacity	Reaction	Shrink-swell potential
	Bedrock	Seasonal high water table			Unified [1]	AASHTO [1]		No. 4 (4.7 mm)	No. 10 (2.0 mm)	No. 40 (0.42 mm)	No. 200 (0.74 mm)						
	Feet	*Feet*	*Inches*				*Percent*					*Percent*		*Inches per hour*	*Inches per inch of soil*	pH	
Ashton: AsA	>4	[3] >5	0–20	Silt loam	ML or CL	A–4		95–100	95–100	90–100	75–90	25–35	5–10	0.6–2.0	0.19–0.23	5.6–7.3	Low.
			20–52	Silt loam or silty clay loam.	CL or ML	A–6 or A–4		95–100	95–100	90–100	80–95	30–40	5–20	0.6–2.0	0.18–0.22	5.6–7.3	Low.
			52–60	Silt loam	CL or ML	A–6 or A–4	0–5	90–100	85–100	80–95	70–90	30–40	5–20	0.6–2.0	0.16–0.20	5.6–7.3	Low.
Cynthiana: ChD, CyF — Rock outcrop part of CyF not rated.	1–1½	>5	0–5	Silty clay loam	CL or CH	A–7	5–30	85–95	85–95	80–95	70–90	40–55	20–30	0.6–2.0	0.15–0.20	6.1–7.3	Moderate.
			5–18	Silty clay	CH, MH, or CL	A–7	10–30	85–95	80–95	80–95	75–90	48–70	20–40	0.2–0.6	0.10–0.15	6.1–7.8	Moderate.
Dunning: Du	>3½	[4] 0–½	0–16	Silty clay loam	CL or ML	A–6 or A–4		100	95–100	90–100	85–95	25–40	10–20	0.6–2.0	0.19–0.22	6.1–7.8	Low.
			16–54	Silty clay	CL, CH, or MH	A–7		95–100	95–100	95–100	90–95	45–60	20–30	<0.2	0.14–0.18	6.1–7.8	Moderate.
*Eden: EdD, EfE3, EhB — For Faywood part of EhB, see Faywood series.	1½–3½ (Rippable)	>5	0–5	Silty clay loam	CL, CH, or MH	A–7 or A–6	0–20	80–100	75–100	75–95	70–95	35–55	15–25	0.2–0.6	0.14–0.18	6.1–8.4	Moderate.
			5–26	Silty clay or shaly silty clay.	MH, ML, or CH	A–7 or A–5	10–30	70–90	70–90	70–90	70–85	40–65	7–35	<0.2	0.10–0.15	6.1–8.4	Moderate.
			26–38	Shaly clay	MH, CL, or CH	A–7	20–40	65–100	60–100	60–100	60–95	45–65	20–35	<0.2	0.06–0.12	7.4–8.4	Moderate.
Faywood — Mapped only with Eden soils.	1½–3½	>3½	0–7	Silty clay loam	CL or ML	A–6	0–10	90–100	90–100	90–100	80–95	30–40	15–20	0.6–2.0	0.17–0.21	5.6–7.3	Low.
			7–34	Silty clay	CH, MH, or CL	A–7	0–10	90–100	90–100	90–100	85–95	48–65	25–35	2.0–6.0	0.12–0.17	5.6–7.3	Moderate.
Huntington: Hu	>4	[5] >3	0–60	Silt loam	ML or CL	A–4 or A–6	0–5	95–100	85–100	85–95	70–90	25–35	5–15	0.6–2.0	0.18–0.23	6.1–7.8	Low.
*Lowell: LoB, LoC, LwB — For Nolin part of LwB, see Nolin series.	>3½	>5	0–7	Silt loam	ML or CL	A–4 or A–6		95–100	95–100	90–100	85–95	25–40	5–15	0.6–2.0	0.19–0.23	5.1–6.5	Low.
			7–23	Silty clay loam	CL, ML, or CH	A–7, A–6, or A–5		95–100	95–100	95–100	85–95	40–60	0–30	0.2–0.6	0.15–0.20	5.1–6.5	Moderate.
			23–60	Silty clay and clay	CH, MH, or CL	A–7		95–100	95–100	95–100	90–95	45–70	25–40	0.2–0.6	0.13–0.17	5.1–6.5	Moderate.
Maury: MaB, MaC	>5	>5	0–16	Silt loam	ML or CL	A–4, A–5, or A–6	0–1	95–100	95–100	85–100	70–90	25–40	5–15	0.6–6.0	0.19–0.23	5.1–7.3	Low.
			16–21	Silty clay loam	CL or ML	A–4 or A–6	0–1	95–100	95–100	90–100	80–95	30–40	10–20	0.6–6.0	0.18–0.22	5.1–6.5	Low.
			21–29	Silty clay loam	CL, ML, CH, or MH	A–6 or A–7	0–1	95–100	95–100	90–100	85–95	35–60	15–30	0.6–2.0	0.16–0.20	5.1–6.0	Low.
			29–76	Silty clay or clay	CH, MH, or CL	A–7	0–1	95–100	95–100	90–100	85–95	30–70	15–35	0.6–2.0	0.14–0.18	5.1–6.0	Low.
McAfee: McC, McD	1½–3½	>3½	0–7	Silt loam	ML or CL	A–4 or A–6	0–10	90–100	85–100	75–95	70–90	25–40	5–15	0.6–2.0	0.18–0.23	5.6–7.3	Low.
			7–13	Silty clay loam	CL or MH	A–6 or A–7	0–10	90–100	85–100	80–100	75–95	35–60	15–25	0.6–2.0	0.13–0.22	5.6–6.5	Moderate.
			13–32	Silty clay	CH, MH, or CL	A–7	1–20	80–99	75–100	75–100	70–95	45–70	25–35	0.2–0.6	0.11–0.18	5.6–6.5	Moderate.
Newark: Ne	>4	[6] ½–1½	0–36	Silt loam	ML or CL	A–4 or A–6		95–100	95–100	90–100	75–90	25–35	5–15	0.6–2.0	0.19–0.23	6.1–7.8	Low.
			36–60	Silty clay loam	CH or MH	A–6 or A–4		95–100	95–100	95–100	85–95	25–50	12–20	0.6–2.0	0.18–0.22	6.1–7.8	Low.
Nicholson: NfB	>5	1½–2½	0–7	Silt loam	ML or CL	A–4 or A–6		95–100	95–100	90–100	80–90	25–40	5–15	0.6–2.0	0.19–0.23	4.5–7.3	Low.
			7–21	Silty clay loam	CL or ML	A–6 or A–4		95–100	95–100	90–100	80–95	30–40	5–20	0.6–2.0	0.18–0.22	4.5–6.5	Low.
			21–34	Silty clay loam (fragipan).	CL or ML	A–6 or A–4		95–100	95–100	80–100	75–95	30–40	10–20	<0.2	[7] 0.09–0.12	4.5–6.0	Low.
			34–60	Silty clay or clay	CH, MH, or CL	A–7		95–100	95–100	60–100	55–95	45–70	10–35	<0.2	[7] 0.09–0.12	4.5–7.8	Moderate.
Nolin: No	4	[5] 3	0–60	Silt loam	ML or CL	A–4 or A–6	0–5	95–100	80–100	80–95	70–90	25–35	5–20	0.6–2.0	0.18–0.23	6.1–7.8	Low.

[1] Estimates based on 100 percent passing the 3-inch sieve.
[2] Liquid limit is expressed as the percentage of dry soil. When a soil has a liquid limit of 100, the weight of the moisture equals the weight of the dry soil.
[3] Subject to rare flooding.
[4] Subject to common flooding.
[5] Available water capacity estimate was reduced because of the fragipan.

SOILS - SHEET 8 OF 8

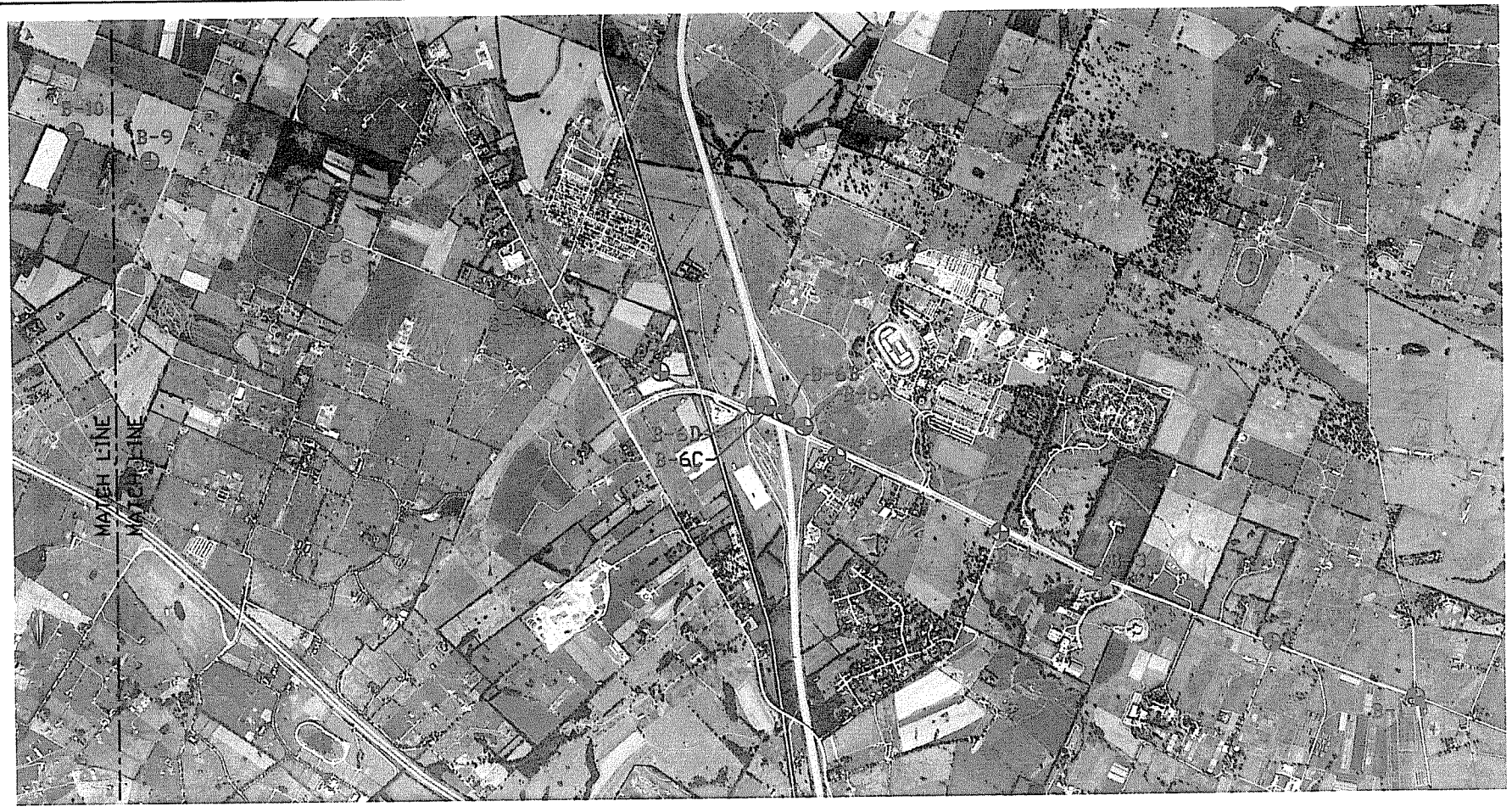
SOILS MAP DESCRIPTION

LOCATION: GEORGETOWN, KENTUCKY | QORE PROJECT NUMBER: 24304536

HDR / QUEST ENGINEERS, INC.

SCALE: NTS
DATE: 4-20-07
DRAWN BY: JAC
CHECKED BY: AF

QORE PROPERTY SCIENCES
427 CODELL DRIVE, LEXINGTON, KENTUCKY 40503
PHONE (859) 233-1518 / FAX (859) 299-2481



AERIAL PHOTOGRAPHS - SHEET 1 OF 3

LEGEND
⊕ B-1 BORING LOCATION

SCALE: 1" = 2000'

0 500 1000 2000 4000

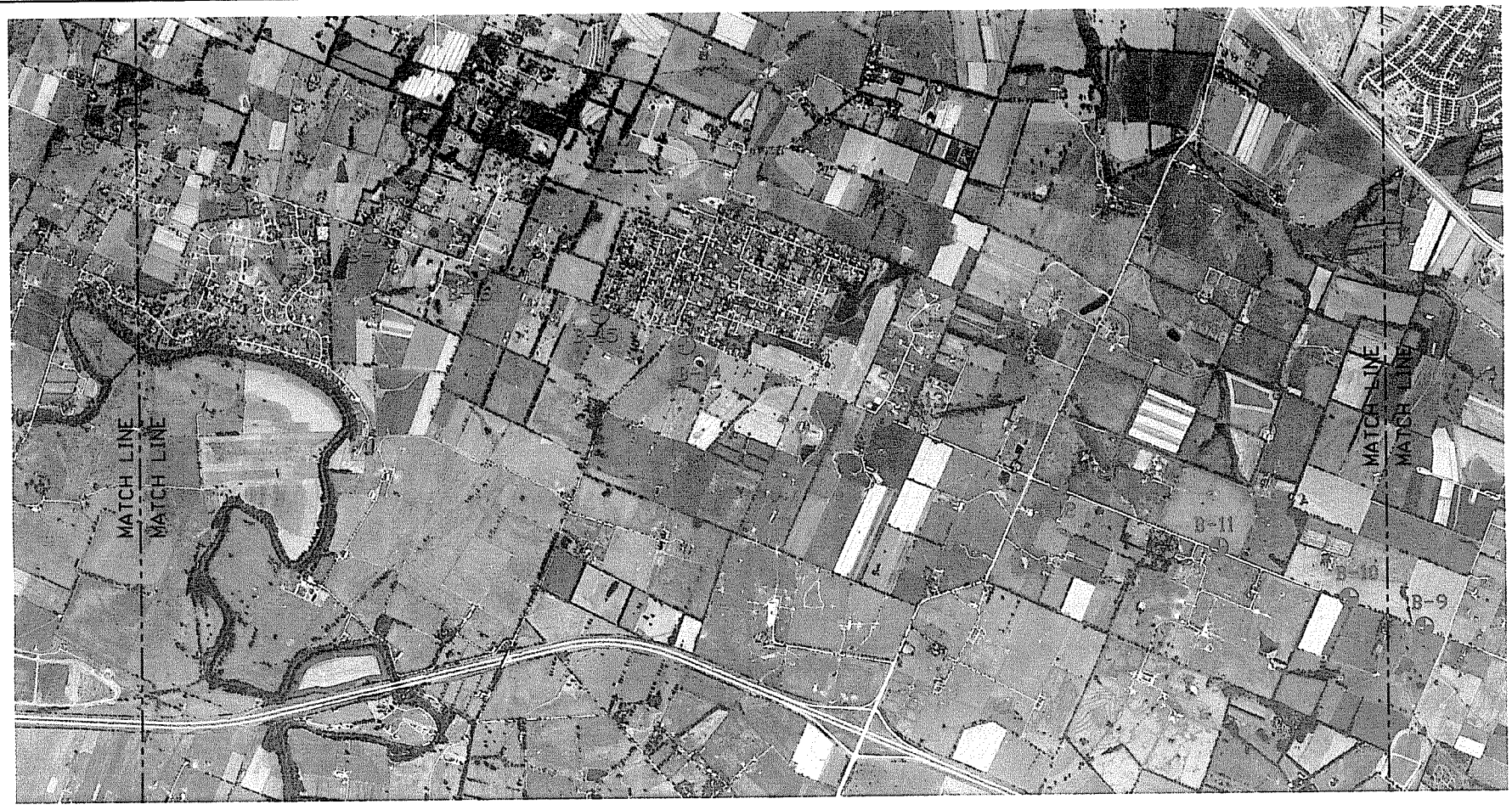
BORING LOCATION MAP

LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304536

HDR / QUEST ENGINEERS, INC.

SCALE:	1" = 2000'
DATE:	4-20-07
DRAWN BY:	JAC
CHECKED BY:	AF

QORE PROPERTY SCIENCES
427 COSELL DRIVE, LEXINGTON, KENTUCKY 40509
PHONE (859) 253-5318 / FAX (859) 299-7491



LEGEND
⊕ B-1 BORING LOCATION

SCALE: 1" = 2000'

0 500 1000 2000 4000

AERIAL PHOTOGRAPHS - SHEET 2 OF 3

BORING LOCATION MAP

LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304536

HDR / QUEST ENGINEERS, INC.

SCALE:	1" = 2000'
DATE:	4-20-07
DRAWN BY:	JAC
CHECKED BY:	AF

QORE PROPERTY SCIENCES
422 GOSSELL DRIVE, LEXINGTON, KENTUCKY 40503
PHONE (859) 293-5516 / FAX (859) 299-2481

LEGEND
⊕ B-1 BORING LOCATION

SCALE: 1" = 2000'

0 500 1000 2000 4000

AERIAL PHOTOGRAPHS - SHEET 3 OF 3

BORING LOCATION MAP

LOCATION:	GEORGETOWN, KENTUCKY	QORE PROJECT NUMBER:	24304536

HDR / QUEST ENGINEERS, INC.

SCALE:	1" = 2000'
DATE:	4-20-07
DRAWN BY:	JAC
CHECKED BY:	AF

QORE PROPERTY SCIENCES
427 COOPER DRIVE, LEXINGTON, KENTUCKY 40503
PHONE (859) 233-1518 / FAX (859) 299-2481

THELEN ASSOCIATES, INC.
Geotechnical • Testing Engineers
1398 Cox Avenue / Erlanger, Kentucky 41018-1002 / 859-746-9400 / Fax 859-746-9408
2140 Waycross Road / Cincinnati, Ohio 45240-2719 / 513-825-4350 / Fax 513-825-4756
www.thelenassoc.com

NOV 28 2007

August 3, 2007

HDR/Quest Engineers, Inc.
2517 Sir Barton Way
Lexington, Kentucky 40509

Attn: Mr. Brent Tippey, P.E.

Re: Geotechnical Consulting Services
KAW 42-Inch Water Main
Contract A
Franklin County, Kentucky

Ladies and Gentlemen:

We have completed our geotechnical consulting services for Contract A of the Kentucky American 42-inch Water Main, Franklin County, Kentucky. This work was completed in accordance with our Proposal-Agreement K27028 dated January 24, 2007 and the Subconsultant Agreement between Thelen Associates, Inc. and HDR/Quest Engineers, Inc. (HDR/Quest) authorized on February 6, 2007. Our geotechnical consulting services included soil test borings, rock coring and laboratory testing of selected samples. The results of the test borings and rock coring are summarized on the Log of Test Borings and the results of the laboratory testing are summarized on our Tabulation of Test Boring Logs and Laboratory Testing sheets, both of which have been previously submitted to HDR/Quest under separate cover.

We appreciate this opportunity to be of service to you on this project. We understand that this project will be going out for bids soon and if you have any questions regarding the information provided or need any further assistance, please feel free to contact us at the contact information above.

Respectfully submitted,
THELEN ASSOCIATES, INC.

Andrew C. Casto, P.E.
Senior Geotechnical Engineer

ACC:tmk
070057E

THELEN ASSOCIATES, INC.
Geotechnical • Testing Engineers
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2140 Waycross Road / Cincinnati, Ohio 45240-2719 / 513-825-4350 / Fax 513-825-4756
www.thelenassoc.com

PROJECT NO.: 070057E
CLIENT: HDR/Quest Engineers, Inc.
PROJECT: Geotechnical Consulting Services, KAW 42-inch Water Main, Contract A
LOCATION: Franklin County, Kentucky

Boring No.	Station (ft)	Offset (ft)
1	19+90	26 L
2	27+50	5L
3	35+50	12 L
4	43+50	10 L
5	51+48	5 L
6	58+50	0
7	66+50	0
8	75+50	0
9	84+50	5 L
10	92+95	4 L
11	101+60	0
12	112+35	0
13	120+05	15 R
14	128+40	5 R
15	136+45	5 R
16	144+45	5 R
17	152+42	5 R
18	162+75	5 R
19	172+44	5 R
20	182+42	3 L
21	189+44	3 L
22	197+45	12 L
23	205+20	12 L
24	214+46	16 L
25	234+35	0
26	241+65	35 R
27	266+42	5 R
28	276+30	0
29	282+35	5 R
30	296+78	0
31	303+30	30 R
32	315+30	0
33	323+40	20 R
34	332+45	0
35	350+10	0
36	365+50	10 R
37	371+16	0
38	377+60	15 R
39	385+60	15 R

Boring No. (continued)	Station (ft) (continued)	Offset (ft) (continued)
40	393+05	5 R
41	401+40	0
42	410+30	0
43	420+40	5 R
44	429+15	0
45	436+65	6 L
46	442+60	2 L
47	450+85	0
48	457+85	3 L
49	466+70	8 R
50	474+80	4 L
51	481+80	20 R
52	488+83	2 L
53	495+70	16 R
54	504+80	12 R
55	514+60	8 R
56	521+87	8 R
57	529+85	5 R
58	537+84	10 R
59	546+85	15 R
60	555+85	7 R
61	564+90	8 R
62	574+05	0
63	581+70	25 R
64	589+90	0
65	595+75	5 L
66	602+75	5 L
67	611+46	2 L
68	618+55	4 L
69	627+75	6 L
70	635+75	7 L
71	643+75	6 L
72	652+75	5 L
73	659+75	2 L
74	667+75	4 L

Tabulation of Test Boring Logs and Laboratory Testing

Boring Number	Estimated Surface Elevation MSL	Depth to Bedrock (ft)	Bedrock Formation	Bedrock Unconfined Compressive Strength (ksf)	Resistivity (ohm-cm)	Redox Potential (mV)	pH	Sulfides	Chlorides (mg/Kg)	Sulfates (mg/Kg)
1	703.0	>10.0	Clays Ferry		2126	+121	7.2	Trace	ND	270
2	709.8	2.0	Clays Ferry	286.3						
3	720.0	8.0	Clays Ferry							
4	706.0	>10.0	Clays Ferry							
5	680.0	2.5	Millersburg	945.0						
6	649.5	2.5	Tanglewood	353.3	4356	+143	6.7	Positive	15	500
7	625.8	>9.8	Tanglewood							
8	601.8	2.5	Tanglewood	978.0						
9	579.8	1.5	Grier	556.5						
10	556.2	5.0	Grier	1608.6	20187	+148	7.1	Positive	14	210
11	537.0	>10.0	Grier							
12	525.0	5.0	Grier	946.4						
13	540.0	2.5	Grier	599.1						
14	584.2	5.0	Grier	1238.7						
15	588.0	2.5	Grier	760.9	5046	+146	6.5	Positive	21	410
16	564.1	1.0	Grier	827.1						
17	531.8	3.5	Grier	559.7						
18	501.0	>10.0	Grier							
19	490.0	>10.0	Grier		1073	+310	5.4	Trace	140	130
20	516.0	1.0	Grier	1038.9						
21	536.0	5.0	Grier	889.1						
22	510.2	>10.0	Grier							
23	531.1	0.7	Grier		20118	+158	6.7	Trace	27	48
24	560.0	3.0	Grier	1078.7						
25	498.0	>10.0	Grier							
26	494.0	>9.3	Grier		1957	+230	7.0	Trace	ND	ND
27	549.2	5.0	Grier	574.0						
28	523.0	>10.0	Grier							
29	509.0	>10.0	Grier							
30	507.0	>9.9	Grier		2610	+235	7.3	Trace	37	19
31	510.0	>10.0	Grier							
32	526.0	>9.2	Grier							
33	546.0	2.5	Grier	1137.5						
34	524.0	1.5	Grier	730.0	14137	+165	7.7	Positive	22	360
35	526.0	>9.4	Grier							
36	526.0	>9.4	Grier							
37	529.0	>10.0	Grier							
38	528.0	>10.0	Grier							
39	532.0	>10.0	Grier		1631	+270	7.4	Trace	110	14
40	538.0	>10.0	Grier							
41	538.0	>10.0	Grier							
42	546.0	>9.9	Grier		818	+275	6.6	Trace	230	25
43	599.0	1.0	Grier	1029.3						
44	604.0	8.0	Grier							
45	622.0	>10.0	Tanglewood							
46	638.0	2.5	Tanglewood	861.9						
47	664.0	2.0	Tanglewood		1957	+178	7.2	Trace	36	15
48	692.0	2.0	Tanglewood							
49	705.0	2.0	Tanglewood							
50	716.0	8.0	Tanglewood							

Thelen Associates, Inc.
1398 Cox Avenue
Erlanger, Kentucky 41018

Quest Engineers, Inc.
Consulting Services
KAW Main For WTP On Pool 3
Contract A
Franklin Co., Kentucky
070057E

Tabulation of Test Boring Logs and Laboratory Testing

Boring Number	Estimated Surface Elevation MSL	Depth to Bedrock (ft)	Bedrock Formation	Bedrock Unconfined Compressive Strength (tsf)	Resistivity (ohm-cm)	Redox Potential (mV)	pH	Sulfides	Chlorides (mg/Kg)	Sulfates (mg/Kg)
51	734.0	>10.0	Tanglewood		1413	+210	6.9	Trace	150	33
52	776.0	>10.0	Tanglewood							
53	802.0	4.5	Tanglewood							
54	772.0	0.2	Tanglewood	773.6	13593	+138	6.8	Positive	16	180
55	752.0	5.2	Clays Ferry	1119.8						
56	744.0	2.0	Clays Ferry	35.5						
57	744.0	2.0	Clays Ferry							
58	739.0	2.0	Clays Ferry		2501	+185	7.2	Positive	55	250
59	723.0	8.0	Clays Ferry							
60	716.0	2.0	Clays Ferry	613.8						
61	728.0	>10.0	Clays Ferry							
62	780.0	0.3	Clays Ferry							
63	733.0	4.5	Clays Ferry							
64	711.0	>10.0	Clays Ferry		1196	+220	7.1	Trace	120	29
65	708.0	>10.0	Clays Ferry							
66	712.0	9.5	Clays Ferry							
67	770.0	1.1	Clays Ferry		4350	+200	7.3	Positive	27	520
68	748.0	2.5	Tanglewood	814.9						
69	770.0	2.9	Tanglewood	831.1						
70	764.0	8.0	Millersburg		1848	+264	6.8	Trace	14	15
71	764.0	8.5	Millersburg							
72	798.0	8.0	Tanglewood							
73	852.2	2.0	Clays/Tangle		8373	+173	7.1	Positive	40	180
74	824.0	>9.4	Tanglewood							

ND = Indicates analyte was not detected at or above the estimate quantitation limit (EQL) of 10mg/Kg

Thelen Associates, Inc.
1398 Cox Avenue
Erlanger, Kentucky 41018

SUMMARY OF LABORATORY TEST DATA

BORING NO.	SAMPLE DEPTH, FT.	SAMPLE TYPE*	USCS	NATURAL MOISTURE CONTENT, PERCENT	Water Soluble Sulfate Ion mg/kg, ppm	Water Soluble Chloride Ion, mg/kg, ppm	UNIT WEIGHT PCF		UNCONFINED COMPRESSIVE STRENGTH PSI	%FINER NO. 200	RESISTIVITY OH-CM	pH
							WET	DRY				
BB-1	8.8-9.4	CORE						166.7	4037			
BB-1		BG		24.9	75	75					1450	8.1
BB-2	9.8-10.4	CORE						165.2	4615			
BB-2		BG		26.1	209	110					1400	7.8
BB-3	10.5-11.0	CORE						164.6	7652			
BB-3		BG		24.8	43	45					2100	7.9
BB-4	8.8-9.5	CORE						166.8	6717			
BB-4		BG		24.1	924	329					900	7.3
BB-5	7.2-7.7	CORE						163.0	4317			
BB-5		BG		29.3	176	617					700	7.7
BB-6	8.3-9.0	CORE						163.1	6134			
BB-6		BG		9.5	175	<10					3900	7.9
BB-6A	5.8-6.2	CORE						166.9	7012			
BB-6B	8.5-9.0	CORE						168.2	4810			

*Table Checked By:*_____

* SS = Split-Spoon Sample (ASTM D 1586); UD = Undisturbed Sample (ASTM D 1587); BG = Bulk Bag Sample; CORE = Rock Core

QORE, INC.
Lexington, Kentucky
Project Name: KAWC 42 inch Waterline
Project Number: 24304536

SUMMARY OF LABORATORY TEST DATA

BORING NO.	SAMPLE DEPTH, FT.	SAMPLE TYPE*	USCS	NATURAL MOISTURE CONTENT, PERCENT	Water Soluble Sulfate Ion mg/kg, ppm	Water Soluble Chloride Ion, mg/kg, ppm	UNIT WEIGHT PCF		UNCONFINED COMPRESSIVE STRENGTH PSI	%FINER NO. 200	RESISTIVITY OH-CM	pH
							WET	DRY				
BB-6C	8.0-8.5	CORE						163.3	4220			
BB-6D	8.5-9.0	CORE						167.3	8280			
BB-7	8.0-8.7	CORE						161.8	3890			
BB-7		BG		26.0	<10	105					1700	7.8
BB-8	8.7-9.3	CORE						166.2	5449			
BB-8		BG		36.0	98	80					1150	7.6
BB-9	11.5-12.0	CORE						166.5	4772			
BB-9		BG		24.8	78	174					1700	7.8
BB-10	11.5-12.0	CORE						159.1	3848			
BB-10		BG		23.5	175	259					1300	7.9
BB-11	6.9-7.5	CORE						163.6	5224			
BB-11		BG		32.9	16	19					2100	7.1

*Table Checked By:*_____

* SS = Split-Spoon Sample (ASTM D 1586); UD = Undisturbed Sample (ASTM D 1587); BG = Bulk Bag Sample; CORE = Rock Core

QORE, INC.
Lexington, Kentucky
Project Name: KAWC 42 inch Waterline
Project Number: 24304536

SUMMARY OF LABORATORY TEST DATA

BORING NO.	SAMPLE DEPTH, FT.	SAMPLE TYPE*	USCS	NATURAL MOISTURE CONTENT, PERCENT	Water Soluble Sulfate Ion mg/kg, ppm	Water Soluble Chloride Ion, mg/kg, ppm	UNIT WEIGHT PCF		UNCONFINED COMPRESSIVE STRENGTH KSF	%FINER NO. 200	RESISTIVITY OHM-CM	pH
							WET	DRY				
BB-12	12.0-12.7	CORE						160.1	4042			
BB-12		BG		23.3	281	225					1200	6.8
BB-13	15.1-15.7	CORE						166.9	8273			
BB-13		BG		23.3	136	288					1200	7.3
BB-14	13.1-13.7	CORE						167.3	3212			
BB-14		BG		27.1	138	58					1300	7.1
BB-15	10.0-10.5	CORE						166.9	5785			
BB-15		BG		28.9	117	214					1100	7.2
BB-16	8.2-8.8	CORE						168.3	5496			
BB-16		BG		27.0	60	75					1300	7.5
BB-17	9.5-10.0	CORE						160.5	6239			
BB-17		BG		25.4	38	30					2700	7.2
BB-18	93.0	CORE						166.7	5163			
BB-18		BG		23.2	112	210					1000	7.2

*Table Checked By:*_____

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QORE, INC.
Lexington, Kentucky
Project Name: KAWC 42 inch Waterline
Project Number: 24304536

SUMMARY OF LABORATORY TEST DATA

BORING NO.	SAMPLE DEPTH, FT.	SAMPLE TYPE*	USCS	NATURAL MOISTURE CONTENT, PERCENT	Water Soluble Sulfate Ion mg/kg, ppm	Water Soluble Chloride Ion, mg/kg, ppm	UNIT WEIGHT PCF		UNCONFINED COMPRESSIVE STRENGTH KSF	%FINER NO. 200	RESISTIVITY OHM-CM	pH
							WET	DRY				
BB-19	13.0-13.5	CORE						166.5	5200			
BB-19		BG		27.5	65	139					1700	7.8
BB-20	15.2-15.7	CORE						166.6	6784			
BB-20		BG		15.7	244	70					1300	6.9
BB-21	13.0-13.4	CORE						167.4	5945			
BB-21		BG		17.9	69	50					1100	7.8
BB-22	16.0-16.5	CORE						162.7	6580			
BB-22		BG		20.0	235	70					890	7.5
BB-23	15.7-16.2	CORE						167.6	7273			
BB-23		BG		24.1	84	174					835	6.9
BB-24	11.0-11.5	CORE						165.2	5851			
BB-24		BG		25.6	126	224					830	6.9
BB-25		CORE						167.0	9204			
BB-25		BG		26.3	98	538					600	6.6

*Table Checked By:*_____

* SS = Split-Spoon Sample (ASTM D 1586); UD = Undisturbed Sample (ASTM D 1587); BG = Bulk Bag Sample; CORE = Rock Core

QORE, INC.
Lexington, Kentucky
Project Name: KAWC 42 inch Waterline
Project Number: 24304536

SUMMARY OF LABORATORY TEST DATA

BORING NO.	SAMPLE DEPTH, FT.	SAMPLE TYPE*	USCS	NATURAL MOISTURE CONTENT, PERCENT	Water Soluble Sulfate Ion mg/kg, ppm	Water Soluble Chloride Ion, mg/kg, ppm	UNIT WEIGHT PCF		UNCONFINED COMPRESSIVE STRENGTH KSF	%FINER NO. 200	RESISTIVITY OHM-CM	pH
							WET	DRY				
BB-26	14.1-14.6	CORE						162.9	6234			
BB-26		BG		25.6	108	309					1500	6.8
BB-27	10.0-10.5	CORE						165.5	4416			
BB-27		BG		21.8	58	164					1700	7.1
BB-28	2.3-2.8	CORE						166.3	3752			
BB-29	6.7-7.2	CORE						160.5	2977			
BB-29		BG		22.6							1900	7.3
BB-30	15.5-16.0	CORE						167.9	6242			
BB-30		BG		26.4							1100	7.0

*Table Checked By:*_____

* SS = Split-Spoon Sample (ASTM D 1586); UD = Undisturbed Sample (ASTM D 1587); BG = Bulk Bag Sample; CORE = Rock Core

QORE, INC.
Lexington, Kentucky
Project Name: KAWC 42 inch Waterline
Project Number: 24304536

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING #: 1

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB #: 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
703.0	SURFACE	0.0						
701.0	Mixed brown and gray moist medium stiff FILL, silty clay, some shale and crushed limestone with limestone floaters.	2.0		I	6/10/15	1	DS	18
	Brown, trace gray moist very stiff SILTY CLAY with shale fragments and limestone floaters (colluvium).			I	6/8/11	2	DS	18
			5	I	5/7/9	3	DS	18
695.0		8.0						
693.0	Mottled brown moist stiff SILTY CLAY with iron oxide stains and concretions.	10.0		I	4/5/27	4	DS	18
	Bottom of test boring at 10.0 feet.		10					
			15					
			20					
			25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 703.0 ft. Hammer Drop 30 in. Rock Core Dia. in. Engineer MES

Date Started 4/5/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/5/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING #: 2

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB #: 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
709.8	SURFACE	0.0						
707.8	Mixed brown and gray moist medium stiff FILL, silty clay with hairlike roots, limestone fragments and organic matter.	2.0		I	3/3/22	1	DS	18
704.8	Interbedded gray moist soft SHALE and gray hard LIMESTONE (bedrock).	5.0		I	50/6"	2	DS	6
699.8	Interbedded gray moist soft to medium tough SHALE and white to gray hard LIMESTONE. Limestone comprised 55 percent of this interval in 1 to 7.5-inch thick beds. [RQD = 52%] (Clays Ferry Formation Bedrock)	10.0	5 10 15 20 25			3	RC	60/60
	Split spoon refusal at 3.0 feet. Bottom of test boring at 10.0 feet.							

Datum Est. MSL | Hammer Wt. 140 lbs. | Hole Diameter 5 in. | Foreman BR

Surf. Elev. 709.8 ft. | Hammer Drop 30 in. | Rock Core Dia. 1-7/8 in. | Engineer MES/ACC

Date Started 4/4/07 | Pipe Size O.D. 2 in. | Boring Method CFA | Date Completed 4/4/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION 1.0 ft.
AFTER – hrs. – ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING #: 3

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB #: 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
720.0	SURFACE							
719.2	ASPHALT	0.8		I	10/16/15	1	DS	18
715.5	Mixed brown and gray moist stiff FILL, silty clay with limestone fragments.	4.5		I	12/12/14	2	DS	18
712.0	Mottled brown and gray moist stiff SILTY CLAY, little clay with iron oxide stains.	8.0	5	I	4/8/9	3	DS	18
710.0	Interbedded brown, trace gray moist very soft highly weathered SHALE and gray hard LIMESTONE (bedrock).	10.0	10	I	6/32/35	4	DS	18
	Bottom of test boring at 10.0 feet.		15					
			20					
			25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 720.0 ft. Hammer Drop 30 in. Rock Core Dia. -- in. Engineer MES

Date Started 4/4/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/4/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING #: 4

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB #: 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
706.0	SURFACE	0.0						
704.0	Mixed brown and gray moist medium stiff FILL, silty clay with asphalt and limestone fragments.	2.0		I	5/15/20	1	DS	18
701.5	Mixed brown and gray moist medium stiff SILTY CLAY with shale fragments and limestone floaters.	4.5		I	3/5/13	2	DS	12
698.0	Brown, trace gray moist stiff SILTY CLAY with limestone fragments, trace bedding planes.	8.0	5	I	12/17/ 50/5"	3	DS	14
696.0	Mottled brown and gray moist stiff SILTY CLAY with roots and limestone floaters, trace bedding planes.	10.0	10	I	15/17/23	4	DS	6
	Bottom of test boring at 10.0 feet.		15 20 25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 706.0 ft. Hammer Drop 30 in. Rock Core Dia. -- in. Engineer MES

Date Started 4/4/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/4/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING # : 5

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB # : 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
680.0	SURFACE	0.0						
677.5	Mixed brown moist stiff FILL, silty clay, trace topsoil with hairlike roots and limestone fragments.	2.5		I	8/31/13	1	DS	18
	Interbedded white to gray hard LIMESTONE and gray moist soft to medium tough SHALE. Limestone comprised 70 percent of this interval in 1 to 7.5-inch thick beds. [RQD = 40%] (Millersburg Member of the Lexington Limestone Formation Bedrock)		5			2	RC	29/30
670.0		10.0				3	RC	44/60
	Bottom of test boring at 10.0 feet.		10 15 20 25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 680.0 ft. Hammer Drop 30 in. Rock Core Dia. 1-7/8 in. Engineer MES/ACC

Date Started 4/4/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/5/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION 0.5 ft.
AFTER — hrs. — ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING #: 6

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB #: 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
649.5	SURFACE	0.5						
	Mixed brown moist medium stiff FILL, silty clay, trace sand with hairlike roots, organic matter, asphalt fragments and limestone fragments.	2.5		I	5/6/20	1A 1B	DS	18
649.0	Brown moist stiff CLAY with iron oxide stains and limestone floaters.		5			2	RC	21/30
647.0	Interbedded white to gray hard LIMESTONE, with thin beds of gray moist medium tough SHALE. Limestone comprised 83 percent of this interval in 1 to 8-inch thick beds. [RQD = 37%] (Tanglewood Limestone Member of the Lexington Limestone Formation Bedrock)					3	RC	60/60
639.5		10.0	10					
	Bottom of test boring at 10.0 feet.		15					
			20					
			25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 649.5 ft. Hammer Drop 30 in. Rock Core Dia. 1-7/8 in. Engineer MES/ACC

Date Started 4/4/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/5/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION 0.5 ft.
AFTER — hrs. — ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING # : 7

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB # : 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
625.8	SURFACE	0.0						
	Mixed brown and gray moist soft FILL, silty clay with hairlike roots, organic matter, limestone fragments and asphalt fragments.	2.0		I	3/10/15	1	DS	18
623.8				I	7/11/2	2	DS	18
	Brown moist stiff SILTY CLAY with iron oxide stains and limestone floaters.		5	I	8/10/8	3	DS	18
617.8		8.0						
616.0	Brown moist stiff SILTY CLAY with limetone floaters, trace bedding planes.	9.8		I	9/10/50/3"	4	DS	12
	Bottom of test boring at 9.8 feet.		10					
			15					
			20					
			25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 625.8 ft. Hammer Drop 30 in. Rock Core Dia. -- in. Engineer MES

Date Started 4/4/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/4/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING #: 8

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB #: 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
601.8	SURFACE	0.0						
599.3	Mixed brown and gray moist stiff FILL, silty clay with shale fragments and limestone floaters.	2.5		I	3/15/18	1	DS	18
	Interbedded white to gray hard thin to thick bedded LIMESTONE, trace biomicrite. [RQD = 67 %] (Tanglewood Limestone Member of the Lexington Limestone Formation Bedrock)		5			2	RC	30/30
						3	RC	60/60
591.8		10.0	10					
	Bottom of test boring at 10.0 feet.		15					
			20					
			25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 601.8 ft. Hammer Drop 30 in. Rock Core Dia. 1-7/8 in. Engineer MES/ACC

Date Started 4/4/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/4/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED 1.5 ft.
AT COMPLETION 1.0 ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING # : 9

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB # : 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
579.8	SURFACE	0.0						
578.3	Mixed brown moist stiff FILL, silty clay with asphalt fragments and limestone floaters.	1.5		I	50/5"	1	DS	5
	Interbedded whitish gray to gray hard LIMESTONE, trace thin shale partings. Limestone in 1 to 13-inch thick beds. [RQD = 80%] (Grier Limestone Member of the Lexington Limestone Formation Bedrock)		5			2	RC	41/42
						3	RC	60/60
569.8		10.0	10					
	Bottom of test boring at 10.0 feet.		15					
			20					
			25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 579.8 ft. Hammer Drop 30 in. Rock Core Dia. 1-7/8 in. Engineer MES/ACC

Date Started 4/3/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/3/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING #: 10

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB #: 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
556.2	SURFACE	0.0						
	Mixed brown and gray moist stiff FILL, silty clay with hairlike roots, shale fragments and limestone floaters.			I	3/10/15	1	DS	18
				I	10/17/21	2	DS	18
551.2		5.0	5					
	Interbedded whitish gray to gray hard thin to medium bedded LIMESTONE with thin shale partings. Limestone in 0.5 to 10-inch thick beds. [RQD = 58%] (Grier Limestone Member of the Lexington Limestone Formation Bedrock).					3	RC	60/60
546.2		10.0	10					
	Bottom of test boring at 10.0 feet.		15 20 25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 556.2 ft. Hammer Drop 30 in. Rock Core Dia. 1-7/8 in. Engineer MES/ACC

Date Started 4/3/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/3/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING # : 11

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB # : 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
537.0	SURFACE	0.5					
536.5	Mixed brown moist medium stiff FILL, silty clay with hairlike roots and limestone fragments.	2.0	I	3/4/5	1A 1B	DS	18
535.0	Brown moist stiff SILTY CLAY with iron oxide stains.		I	2/3/4	2	DS	18
	Brown moist stiff SILTY CLAY with limestone floaters.		I	5/7/8	3	DS	18
529.0		8.0					
527.0	Brown moist stiff SILTY CLAY, some sand with limestone floaters.	10.0	I	10/7/23	4	DS	18
	Bottom of test boring at 10.0 feet.						

DEPTH SCALE (feet): 5, 10, 15, 20, 25

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 537.0 ft. Hammer Drop 30 in. Rock Core Dia. -- in. Engineer MES

Date Started 4/3/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/3/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING # : 12

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB # : 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
525.0	SURFACE	0.0					
523.0	Mixed brown moist stiff FILL, silty clay, trace topsoil with hairlike roots and limestone fragments.	2.0	I	10/10/13	1	DS	3
520.0	Brown moist stiff to very stiff CLAY with iron oxide stains.	5.0	I	6/6/6	2	DS	18
515.0	Interbedded whitish gray to gray hard thin to medium bedded LIMESTONE with thin shale partings. Limestone in 0.5 to 7.5-inch thick beds. [RQD = 62%] (Grier Limestone Member of the Lexington Limestone Formation Bedrock)	10.0			3	RC	60/60
	Bottom of test boring at 10.0 feet.						

DEPTH SCALE (feet): 5, 10, 15, 20, 25

Datum Est. MSL | Hammer Wt. 140 lbs. | Hole Diameter 5 in. | Foreman BR

Surf. Elev. 525.0 ft. | Hammer Drop 30 in. | Rock Core Dia. 1-7/8 in. | Engineer MES/ACC

Date Started 4/3/07 | Pipe Size O.D. 2 in. | Boring Method CFA | Date Completed 4/3/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION 0.5 ft.
AFTER – hrs. – ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING # : 13

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB # : 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
540.0	SURFACE	0.5						
539.5	ASPHALT	2.5		I	12/22/32	1	DS	9
537.5	Mixed brown and gray moist medium stiff FILL, silty clay with shale fragments and limestone floaters.					2	RC	26/30
	Interbedded whitish gray to gray hard thin to medium bedded LIMESTONE with thin shale partings. Limestone in 0.5 to 8.5-inch thick beds. {RQD = 28%} (Grier Limestone Member of Lexington Limestone Formation Bedrock)		5			3	RC	55/60
530.0		10.0	10					
	Bottom of test boring at 10.0 feet.		15					
			20					
			25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 540.0 ft. Hammer Drop 30 in. Rock Core Dia. 1-7/8 in. Engineer MES/ACC

Date Started 4/3/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/3/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER — hrs. — ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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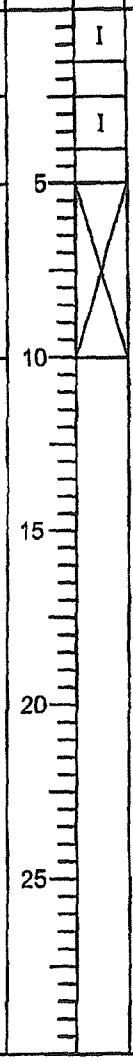
LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING # : 14

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB # : 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
584.2	SURFACE	0.0					
581.7	Mixed brown and gray moist medium stiff FILL, silty clay with shale fragments and limestone fragments.	2.5	I	3/9/15	1	DS	12
579.7	Brown moist stiff SILTY CLAY with limestone floaters.	5.0	I	22/17/31	2	DS	18
574.2	Interbedded whitish gray to gray hard thin to medium bedded LIMESTONE, trace thin shale partings. Limestone in 0.5 to 7.5-inch thick beds. [RQD = 62 %] (Grier Limestone Member of the Lexington Limestone Formation Bedrock)	10.0			3	RC	57/60
	Bottom of test boring at 10.0 feet.						



Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 584.2 ft. Hammer Drop 30 in. Rock Core Dia. 1-7/8 in. Engineer MES/ACC

Date Started 4/3/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/3/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING #: 15

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB #: 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (Inches)
588.0	SURFACE	0.0						
585.5	Mixed brown moist medium dense FILL, crushed limestone, trace silty clay.	2.5		I	3/3/9	1	DS	9
	Interbedded whitish gray to gray hard thin to medium bedded LIMESTONE with thin shale partings. Limestone in 0.5 to 5.0-inch thick beds. [RQD = 29%] (Grier Limestone Member of Lexington Limestone Formation Bedrock)		5			2	RC	15/30
						3	RC	33/60
578.0		10.0	10					
	Bottom of test boring at 10.0 feet.		15					
			20					
			25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 588.0 ft. Hammer Drop 30 in. Rock Core Dia. 1-7/8 in. Engineer MES/ACC

Date Started 4/2/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/2/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER – hrs. – ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING #: 16

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB #: 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
564.1	SURFACE	0.0						
563.1	Mixed brown moist loose FILL, crushed limestone, trace silty clay.	1.0		I	6/ 50/1"	1	DS	5
	Interbedded whitish gray to gray thin to medium bedded LIMESTONE with thin shale partings. Limestone in 0.5 to 10-inch thick beds. Limestone fractured and faulted between 1.0 and 7.0 feet. [RQD = 31%] (Grier Limestone Member of Lexington Limestone Formation Bedrock)		5			2	RC	24/48
						3	RC	48/60
554.1		10.0	10					
	Bottom of test boring at 10.0 feet.		15					
			20					
			25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 564.1 ft. Hammer Drop 30 in. Rock Core Dia. 1-7/8 in. Engineer MES/ACC

Date Started 4/2/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/2/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER – hrs. – ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING # : 17

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB # : 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
531.8	SURFACE	0.2						
531.6	TOPSOIL			I	4/4/9	1A 1B	DS	17
528.3	Mixed brown and gray moist stiff SILTY CLAY with shale fragments and limestone floaters.	3.5		I	40/ 50/6"	2	DS	6
						3	RC	9.5/18
	Interbedded whitish gray to gray hard thin to medium bedded LIMESTONE with thin shale partings. Limestone fractured and faulted between 3.5 feet and 5.5 feet. Limestone in 0.5 to 5.0-inch thick beds. [RQD = 47 %] (Grier Limestone Member of the Lexington Limestone Formation Bedrock)		5					
						4	RC	59/60
521.8		10.0	10					
	Bottom of test boring at 10.0 feet.		15					
			20					
			25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 531.8 ft. Hammer Drop 30 in. Rock Core Dia. 1-7/8 in. Engineer MES/ACC

Date Started 4/2/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/2/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING #: 18

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB #: 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
501.0	SURFACE	0.5		I	50/6"	1	DS	5
500.5	ASPHALT	1.0						
500.0	Mixed gray moist stiff FILL, silty clay with shale fragments and limestone floaters.					2	RC	33/48
	Mixed whitish gray to gray rock FILL, gravel to boulder size limestone, trace silty clay.		5			3	RC	60/60
491.0		10.0	10					
	Bottom of test boring at 10.0 feet.		15 20 25					

Datum Est. MSL | Hammer Wt. 140 lbs. | Hole Diameter 5 in. | Foreman BR

Surf. Elev. 501.0 ft. | Hammer Drop 30 in. | Rock Core Dia. 1-7/8 in. | Engineer MES/ACC

Date Started 4/2/07 | Pipe Size O.D. 2 in. | Boring Method CFA | Date Completed 4/2/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER — hrs. " ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

BORING #: 19

CLIENT: Quest Engineers, Inc. JOB #: 070057E

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (Inches)
490.0	SURFACE	0.2						
489.8	TOPSOIL	2.0		I	2/18/19	1A 1B	DS	13
488.0	Dark brown moist medium stiff SILTY CLAY with hairlike roots.	4.5		I	5/6/10	2	DS	18
485.5	Dark brown moist stiff SILTY CLAY with iron oxide stains.		5	I	7/8/12	3	DS	18
	Brown moist very stiff SILTY CLAY with iron oxide stains.							
480.0		10.0	10	I	6/8/9	4	DS	18
	Bottom of test boring at 10.0 feet.		15					
			20					
			25					

Datum Est. MSL | Hammer Wt. 140 lbs. | Hole Diameter 5 in. | Foreman BR

Surf. Elev. 490.0 ft. | Hammer Drop 30 in. | Rock Core Dia. – in. | Engineer MES

Date Started 4/2/07 | Pipe Size O.D. 2 in. | Boring Method CFA | Date Completed 4/2/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED 2.0 ft.
AT COMPLETION Dry ft.
AFTER – hrs. – ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING # : 20

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB # : 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
516.0	SURFACE	0.5					
515.5	ASPHALT	1.0					
515.0	Mixed gray moist medium dense FILL, silty gravel (DGA).						
	Interbedded whitish gray to gray, some brown hard thin to medium bedded weathered LIMESTONE with thin shale partings. Evidence of dissolution (karst conditions) along bedding, with some secondary infilling. Potential for voids. Limestone in 0.5 to 5.0-inch thick beds. [RQD = 7 %] (Grier Limestone Member of the Lexington Limestone Formation Bedrock)				1	RC	37/48
508.8		7.2			2	RC	60/60
	Interbedded whitish gray to gray thin to medium bedded LIMESTONE with thin shale partings. Limestone in 0.5 to 6-inch thick beds. [RQD = 30 %] (Grier Limestone Member of the Lexington Limestone Formation Bedrock)	10.0					
506.0							
	Bottom of test boring at 10.0 feet.						

5 10 15 20 25

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 516.0 ft. Hammer Drop 30 in. Rock Core Dia. 1-7/8 in. Engineer MES/ACC

Date Started 4/2/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/2/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER — hrs. — ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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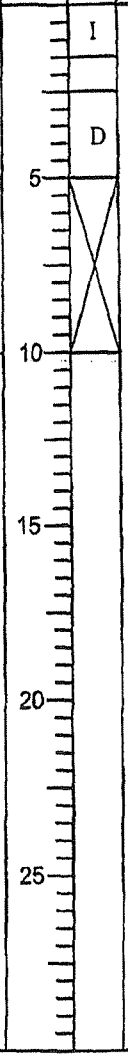
LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING #: 21

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB #: 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
536.0	SURFACE	0.5						
535.5	TOPSOIL			I	2/6/5	1A 1B	DS	12
531.0	Mixed brown moist medium stiff FILL, silty clay, some topsoil with limestone floaters and hairlike roots.	5.0		D		2	CA	6
526.0	Interbedded whitish gray to gray, some brown hard thin to medium bedded weathered LIMESTONE with thin shale partings. Evidence of dissolution (karst condition) along bedding, with secondary infilling. Potential for voids. Limestone in 0.5 to 4.0 inch thick beds. [RQD = 16 %] (Grier Limestone Member of the Lexington Limestone Formation Bedrock)	10.0				3	RC	37/60
	Bottom of test boring at 10.0 feet.							



Datum Est. MSL | Hammer Wt. 140 lbs. | Hole Diameter 5 in. | Foreman BR

Surf. Elev. 536.0 ft. | Hammer Drop 30 in. | Rock Core Dia. 1-7/8 in. | Engineer MES/ACC

Date Started 3/30/07 | Pipe Size O.D. 2 in. | Boring Method CFA | Date Completed 3/30/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING # : 22

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB # : 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
510.2	SURFACE	0.5					
509.7	ASPHALT	2.0	I	3/3/5	1	DS	18
508.2	Dark brown moist medium stiff SILTY CLAY with roots.		I	4/4/5	2	DS	18
505.7	Brown moist stiff SILTY CLAY, trace iron oxide stains.	4.5					
	Mottled brown moist stiff SILTY CLAY with iron oxide stains.		I	3/3/7	3	DS	18
502.2		8.0					
500.2	Mottled brown moist stiff CLAY with iron oxide stains and limestone floaters.	10.0	I	6/8/10	4	DS	18
	Bottom of test boring at 10.0 feet.						

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 510.2 ft. Hammer Drop 30 in. Rock Core Dia. -- in. Engineer MES

Date Started 3/30/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 3/30/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING #: 23

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB #: 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
531.8	SURFACE							
		0.7						
531.1	ASPHALT							
	Interbedded whitish gray to gray, some brown hard thin to medium bedded weathered LIMESTONE with thin shale partings. Evidence of dissolution (karst condition) along bedding planes. Potential for voids. Limestone in 0.5 to 3-inch thick beds. [RQD = 0%] (Grier Limestone Member of the Lexington Limestone Formation Bedrock)		5			1	RC	24/53
						2	RC	19/60
521.8		10.0	10					
	Bottom of test boring at 10.0 feet.		15					
			20					
			25					

Datum Est. MSL | Hammer Wt. 140 lbs. | Hole Diameter 5 in. | Foreman BR

Surf. Elev. 531.8 ft. | Hammer Drop 30 in. | Rock Core Dia. 1-7/8 in. | Engineer MES/ACC

Date Started 3/30/07 | Pipe Size O.D. 2 in. | Boring Method CFA | Date Completed 3/30/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING # : 24

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB # : 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
560.0	SURFACE	0.5						
559.5	ASPHALT			I	10/15/6	1	DS	18
557.0	Dark brown moist medium stiff SILTY CLAY with limestone floaters.	3.0				2	RC	17.5/24
	Interbedded whitish gray to gray, trace brown thin to medium bedded LIMESTONE with thin shale partings. Limestone in 0.5 to 6-inch thick beds. [RQD = 39%] (Grier Limestone Member of the Lexington Limestone Formation Bedrock)		5			3	RC	60/60
550.0		10.0	10					
	Bottom of test boring at 10.0 feet.		15 20 25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 560.0 ft. Hammer Drop 30 in. Rock Core Dia. 1-7/8 in. Engineer MES/ACC

Date Started 3/30/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 3/30/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING #: 25

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB #: 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
498.0	SURFACE	0.0						
496.0	Mixed brown moist stiff FILL, clay with hairlike roots and crushed limestone, trace organic matter.	2.0		I	11/5/8	1	DS	18
493.5	Mixed brown moist stiff FILL, silty clay with iron oxide stains.	4.5		I	5/7/7	2	DS	18
490.0	Mixed brown, trace dark gray and green moist stiff FILL, silty clay, trace topsoil.	8.0	5	I	4/5/8	3	DS	18
488.0	Brown moist stiff SILTY CLAY, trace iron oxide stains.	10.0	10	I	5/9/9	4	DS	18
	Bottom of test boring at 10.0 feet.		15 20 25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 498.0 ft. Hammer Drop 30 in. Rock Core Dia. – in. Engineer MES

Date Started 4/3/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 4/3/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING #: 26

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB #: 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (Inches)
494.0	SURFACE	0.0						
492.5	TOPSOIL	1.5		I	5/4/3	1A 1B	DS	18
490.0	Dark brown moist stiff SILTY CLAY.	4.0		I	3/8/11	2	DS	6
486.0	Brown moist stiff SILTY CLAY, trace iron oxide stains.	8.0	5	I	5/7/7	3	DS	18
484.7	Brown moist stiff SILTY CLAY with limestone fragments.	9.3	10	I	12/ 50/4"	4	DS	9
	Bottom of test boring at 9.3 feet.		15 20 25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 494.0 ft. Hammer Drop 30 in. Rock Core Dia. -- in. Engineer MES

Date Started 3/29/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 3/29/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED Trace @ 8.7 ft.
AT COMPLETION 8.7 ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING #: 27

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB #: 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
549.2	SURFACE	0.3					
548.9	TOPSOIL	2.0	I	2/2/2	1A 1B	DS	18
547.2	Brown moist stiff CLAY with iron oxide stains, trace hairlike roots.		I	50/6"	2	DS	6
544.2	Brown moist stiff CLAY with limestone floaters.	5.0					
539.2	Interbedded whitish gray to gray, trace brown thin to medium bedded LIMESTONE with thin shale partings. Limestone is in 0.5 to 6.0-inch thick beds. [RQD = 29%] (Grier Limestone Member of the Lexington Limestone Formation Bedrock)	10.0			3	RC	60/60
	Bottom of test boring at 10.0 feet.						

DEPTH SCALE (feet): 5, 10, 15, 20, 25

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 549.2 ft. Hammer Drop 30 in. Rock Core Dia. 1-7/8 in. Engineer MES/ACC

Date Started 3/29/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 3/29/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION 2.0 ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING #: 28

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB #: 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
523.0	SURFACE	0.5						
522.5	ASPHALT			I	7/9/12	1	DS	18
	Mottled brown moist stiff SILTY CLAY with iron oxide stains and limestone floaters.			I	17/21/22	2	DS	6
			5	I	15/16/20	3	DS	18
515.0		8.0						
513.0	Brown moist stiff SILTY CLAY with limestone floaters.	10.0		I	26/36/50	4	DS	18
	Bottom of test boring at 10.0 feet.		10					
			15					
			20					
			25					

Datum Est. MSL Hammer Wt. 140 lbs. Hole Diameter 5 in. Foreman BR

Surf. Elev. 523.0 ft. Hammer Drop 30 in. Rock Core Dia. -- in. Engineer MES

Date Started 3/29/07 Pipe Size O.D. 2 in. Boring Method CFA Date Completed 3/29/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS

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LOG OF TEST BORING

CLIENT: Quest Engineers, Inc. BORING # : 29

PROJECT: Consulting Services, KAW Main for WTP on Pool 3, Contract A, Franklin Co., KY JOB # : 070057E

LOCATION OF BORING:

ELEV.	SOIL DESCRIPTION COLOR, MOISTURE, DENSITY, PLASTICITY, SIZE, PROPORTIONS	STRATA DEPTH (feet)	DEPTH SCALE (feet)	SAMPLE Cond	Blows/6"	No.	Type	Rec. (inches)
509.0	SURFACE	0.3						
508.7	ASPHALT	2.0		I	4/5/7	1	DS	18
507.0	Mixed brown moist medium stiff SILTY CLAY with limestone floaters and asphalt fragments.			I	4/5/5	2	DS	18
	Dark brown moist stiff SILTY CLAY.		5	I	4/6/9	3	DS	18
501.0		8.0						
499.0	Dark brown moist stiff SILTY CLAY with limestone floaters.	10.0	10	I	27/7/9	4	DS	4
	Bottom of test boring at 10.0 feet.		15					
			20					
			25					

Datum Est. MSL | Hammer Wt. 140 lbs. | Hole Diameter 5 in. | Foreman BR

Surf. Elev. 509.0 ft. | Hammer Drop 30 in. | Rock Core Dia. -- in. | Engineer MES

Date Started 3/29/07 | Pipe Size O.D. 2 in. | Boring Method CFA | Date Completed 3/29/07

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

SAMPLE TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

GROUNDWATER DEPTH
FIRST NOTED None ft.
AT COMPLETION Dry ft.
AFTER -- hrs. -- ft.
BACKFILLED Immed. hrs.

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST - DRIVING 2" O.D. SAMPLER 1' WITH 140# HAMMER FALLING 30"; COUNT MADE AT 6" INTERVALS