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TRANSMITTAL

To: Mr. Kevin Weber	From: Mark Rawlings
Company: Lunda Construction Co.	No. of Sheets: 51
E-mail: kweber@lundaconstruction.com	Date: November 24, 2014

RE: Dynamic Testing Results – USH 10 over Little Lake Butte des Morts
Structure B-70-403 - Pier 1
Winnebago County, Wisconsin

On November 19, 2014, Pier 1 #1, Pier 1 #36, and Pier 1 #44 at the above structure were dynamically tested during initial driving. Project plans indicated the exterior row piles have a required driving resistance or ultimate capacity of 480 kips (240 tons) and the interior row piles have a required driving resistance or ultimate capacity of 400 kips (200 tons). The reference grade at the bottom of the footing excavations was reported to be at elevation El. 749. The piles have a required minimum tip elevation of El. 691. The 80.5 foot long HP 14 x 73 H-piles were equipped with driving shoes and were driven with an APE D30-42 hammer (number PD 0256) operated on fuel setting 4.

Pier 1 #1 was driven to a depth of 73.5 feet which corresponds to a pile tip elevation of El. 675.5. The reported pile set over the final ten blows of driving was 1.5 inches. The average hammer stroke over this increment was 7.4 feet. Pier 1 #36 was driven to a depth of 70.3 feet which corresponds to a pile tip elevation of El. 678.7. The reported pile set over the final ten blows was 2.5 inches. The average hammer stroke over this increment was 7.0 feet. Pier 1 #44 was driven to a depth of 68.8 feet which corresponds to a pile tip elevation of El. 680.2. The reported pile set over the final ten blows was 1.6 inches. The average hammer stroke over this increment was 7.3 feet.

Restrike testing was performed on these three piles on November 20. Pier 1 #1 was driven approximately 4.5 inches during the restrike testing. The reported pile set was $\frac{1}{4}$ inch for five blows at the beginning and $\frac{1}{2}$ inch for seven blows at the end of the restrike. The average hammer stroke was 7.5 feet at the beginning and 7.3 feet at the end of the restrike event. Pier 1 #36 was driven approximately 3.6 inches during the restrike test. The reported pile set was $\frac{3}{4}$ inch for five blows at the beginning of restrike and 1 inch for five blows at the end of restrike. The average hammer strokes at the beginning and end of restrike were 7.2 and 7.1 feet, respectively. Pier 1 #44 was driven approximately 2.6 feet during the restrike test due to an indicated decrease in capacity from the prior day's results. The reported pile set was $\frac{1}{2}$ inch for five blows at the beginning and $1\frac{1}{8}$ inches for ten blows at the end of the restrike. The average hammer stroke was 7.1 feet at the beginning and 7.5 feet at the end of the restrike event.

November 24, 2014

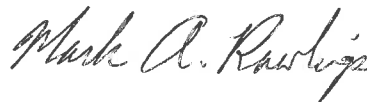
The dynamic test data indicated the piles were not driven to solid bedrock. Our driving recommendations have been prepared on a blows-per-inch basis. The criteria should be applied only after the minimum pile tip elevation is achieved. For the 480 and 400 kip piles driven with APE D30-42 hammer (PD 0256) in Pier 1 of the USH 10 bridge over Little Lake Butte des Morts we recommend using the following criteria:

Field Observed Hammer Stroke (feet)	Exterior Piles (480 kips) Recommended Minimum Blow Count (blows per inch)	Interior Piles (400 kips) Recommended Minimum Blow Count (blows per inch)
6.5	8	5
7.0	6	4
7.5	6	4
8.0	5	4
8.5	5	4
9.0	5	4
9.5	5	4
10.0	5	4

We recommend the above blow counts at the required stroke be maintained for **three consecutive inches** of driving. Driving may be halted if the required blow count is achieved in less than a full foot of driving. Driving should be halted if a blow count of 10 blows per inch at a 9 foot stroke or higher is achieved prior to attaining the requisite blows in the foot. We anticipate the production piles will terminate at depths similar to those of the test pile.

Please call if you have any questions on these recommendations.

GRL Engineers, Inc.



Mark Rawlings



Travis Coleman, P.E.

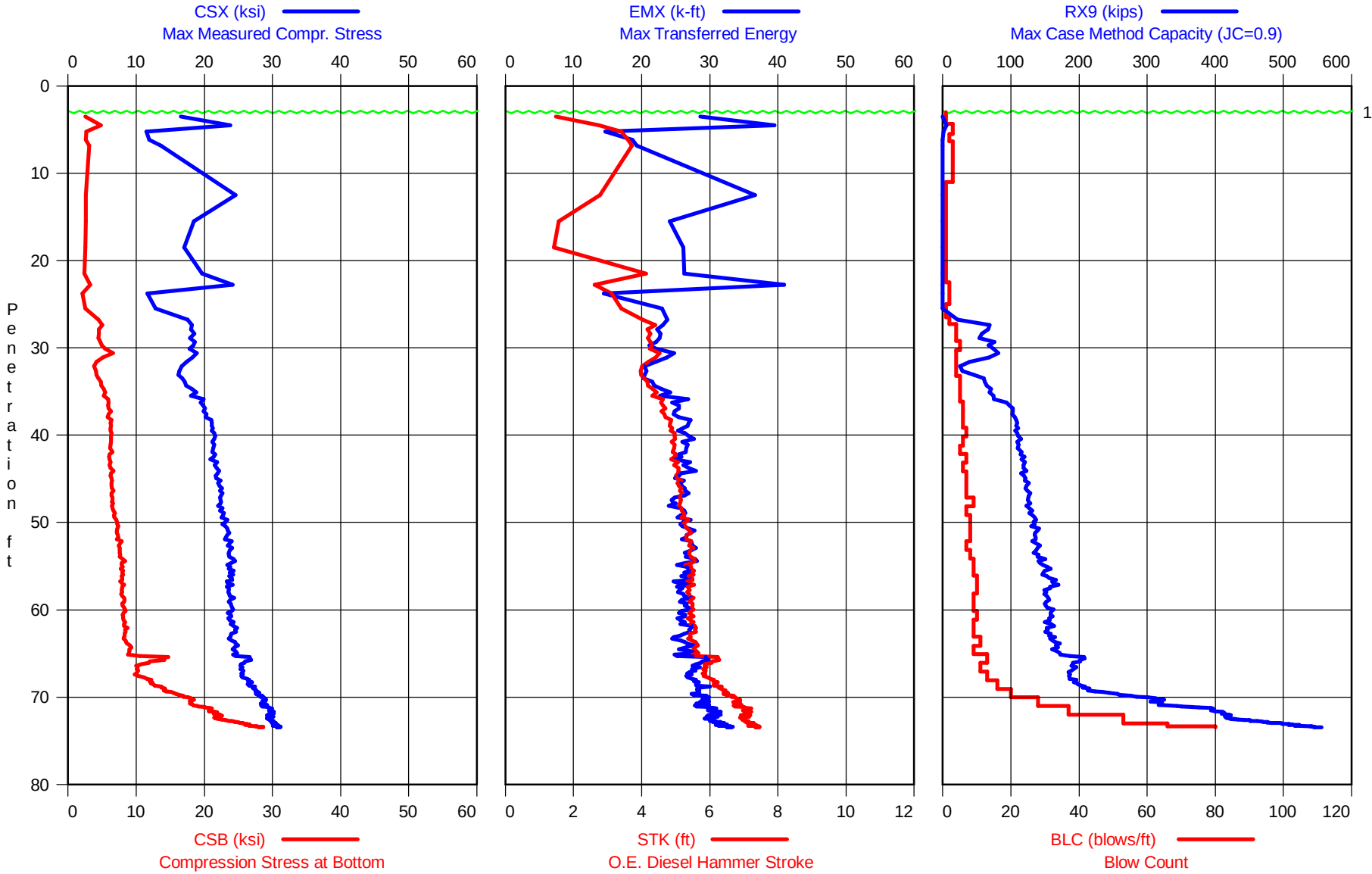
Cc: Jeff Horsfall – jeffrey.horsfall@dot.wi.gov

Attachments:

Dynamic Test Results - (pages 3 – 31)

CAPWAP Analysis Results - (pages 32 – 51)

USH 10 over Little Lake Butte des Morts - Pier 1 #1
APE D30-42, HP 14 x 73



USH 10 over Little Lake Butte des Morts - Pier 1 #1
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

AR: 21.40 in² SP: 0.492 k/ft³
LE: 77.50 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 1.20

CSX: Max Measured Compr. Stress STK: O.E. Diesel Hammer Stroke
CSB: Compression Stress at Bottom BPM: Blows per Minute
EMX: Max Transferred Energy RX9: Max Case Method Capacity (JC=0.9)

BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
1	3.00	1	AV1	21.6	2.9	37	**	**	0
			MAX	21.6	2.9	37	**	**	0
			MIN	21.6	2.9	37	**	**	0
2	4.00	1	AV1	11.5	2.1	20	3.0	66.7	0
			MAX	11.5	2.1	20	3.0	66.7	0
			MIN	11.5	2.1	20	3.0	66.7	0
5	5.00	3	AV3	20.7	4.3	32	4.6	55.4	4
			STD	4.4	0.8	11	0.9	5.4	5
			MAX	24.0	5.0	45	5.5	60.8	12
			MIN	14.5	3.2	18	3.6	50.0	0
7	6.00	2	AV2	9.1	2.2	13	3.3	63.8	1
			STD	0.5	0.0	2	0.1	0.6	1
			MAX	9.6	2.2	14	3.3	64.4	2
			MIN	8.6	2.2	11	3.2	63.2	0
10	7.00	3	AV3	13.8	3.0	21	3.8	59.7	0
			STD	1.5	0.5	3	0.2	1.4	0
			MAX	15.5	3.7	23	3.9	61.6	0
			MIN	11.8	2.5	16	3.5	58.5	0
10	8.00	3	AV1	22.2	2.9	36	**	**	0
			MAX	22.2	2.9	36	**	**	0
			MIN	22.2	2.9	36	**	**	0
10	9.00	3	AV1	26.9	2.3	38	5.6	49.7	0
			MAX	26.9	2.3	38	5.6	49.7	0
			MIN	26.9	2.3	38	5.6	49.7	0
10	10.00	3	AV1	23.3	3.2	32	**	**	0
			MAX	23.3	3.2	32	**	**	0
			MIN	23.3	3.2	32	**	**	0
11	11.00	1	AV1	13.7	2.0	17	3.1	64.9	0
			MAX	13.7	2.0	17	3.1	64.9	0
			MIN	13.7	2.0	17	3.1	64.9	0
11	12.00	1	AV1	11.1	1.5	12	2.8	67.8	0
			MAX	11.1	1.5	12	2.9	67.8	0
			MIN	11.1	1.5	12	2.9	67.8	0
11	13.00	1	AV1	22.9	3.6	40	**	**	0
			MAX	22.9	3.6	40	**	**	0
			MIN	22.9	3.6	40	**	**	0
12	14.00	1	AV1	25.3	3.0	35	5.3	50.7	0
			MAX	25.3	3.0	35	5.3	50.7	0
			MIN	25.3	3.0	35	5.3	50.7	0
13	15.00	1	AV1	14.1	1.8	17	2.9	67.0	0
			MAX	14.1	1.8	17	2.9	67.0	0
			MIN	14.1	1.8	17	2.9	67.0	0

USH 10 over Little Lake Butte des Morts - Pier 1 #1
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
14	16.00	1	AV1	23.8	3.2	46	**	**	0
			MAX	23.8	3.2	46	**	**	0
			MIN	23.8	3.2	46	**	**	0
14	17.00	1	AV1	24.5	3.4	36	5.2	51.1	0
			MAX	24.5	3.4	36	5.2	51.1	0
			MIN	24.5	3.4	36	5.2	51.1	0
15	18.00	1	AV1	13.1	2.3	16	3.2	64.7	0
			MAX	13.1	2.3	16	3.2	64.7	0
			MIN	13.1	2.3	16	3.2	64.7	0
16	19.00	1	AV1	10.2	2.0	13	3.1	65.6	0
			MAX	10.2	2.0	13	3.1	65.6	0
			MIN	10.2	2.0	13	3.1	65.6	0
16	20.00	1	AV1	11.2	1.9	19	3.2	64.1	0
			MAX	11.2	1.9	19	3.2	64.1	0
			MIN	11.2	1.9	19	3.2	64.1	0
17	21.00	1	AV1	14.5	3.2	27	3.6	61.0	0
			MAX	14.5	3.2	27	3.6	61.0	0
			MIN	14.5	3.2	27	3.6	61.0	0
18	22.00	1	AV1	18.0	4.1	25	4.0	57.7	0
			MAX	18.0	4.1	25	4.0	57.7	0
			MIN	18.0	4.1	25	4.0	57.7	0
20	23.00	2	AV1	17.1	4.8	22	4.0	57.9	44
			MAX	17.1	4.8	22	4.0	57.9	44
			MIN	17.1	4.8	22	4.0	57.9	44
22	24.00	2	AV1	17.2	5.1	22	4.3	56.4	70
			MAX	17.2	5.1	22	4.3	56.4	70
			MIN	17.2	5.1	22	4.3	56.4	70
23	25.00	1	AV1	19.1	5.0	25	4.5	54.7	68
			MAX	19.1	5.0	25	4.5	54.7	68
			MIN	19.1	5.0	25	4.5	54.7	68
24	26.00	1	AV1	18.5	4.8	23	4.3	56.3	59
			MAX	18.5	4.8	23	4.3	56.3	59
			MIN	18.5	4.8	23	4.3	56.3	59
26	27.00	2	AV1	17.5	4.3	21	4.1	57.5	74
			MAX	17.5	4.3	21	4.1	57.5	74
			MIN	17.5	4.3	21	4.1	57.5	74
30	28.00	4	AV1	18.7	4.5	23	4.3	55.8	59
			MAX	18.7	4.5	23	4.4	55.8	59
			MIN	18.7	4.5	23	4.4	55.8	59
34	29.00	4	AV3	18.0	4.5	22	4.2	56.9	55
			STD	0.5	0.1	1	0.1	0.5	8
			MAX	18.4	4.5	24	4.3	57.4	64
			MIN	17.4	4.4	22	4.1	56.3	44
39	30.00	5	AV5	18.3	4.9	21	4.2	56.5	71
			STD	0.6	0.1	1	0.1	0.5	4
			MAX	18.7	5.0	22	4.4	57.3	77
			MIN	17.2	4.6	20	4.1	55.8	65
43	31.00	4	AV4	18.8	6.2	25	4.5	55.0	77
			STD	0.2	0.6	1	0.1	0.4	7
			MAX	19.0	7.2	25	4.6	55.7	87
			MIN	18.4	5.5	23	4.4	54.6	68

USH 10 over Little Lake Butte des Morts - Pier 1 #1
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
47	32.00	4	AV4	17.4	4.2	22	4.2	56.8	44
			STD	0.2	0.5	1	0.1	0.6	17
			MAX	17.6	4.7	23	4.3	57.7	68
			MIN	17.0	3.7	20	4.0	56.1	27
51	33.00	4	AV4	16.1	4.1	21	4.0	58.4	29
			STD	0.5	0.2	0	0.0	0.3	4
			MAX	16.5	4.5	21	4.0	58.8	33
			MIN	15.2	3.8	20	3.9	58.2	24
56	34.00	5	AV5	17.0	4.6	21	4.1	57.3	60
			STD	0.6	0.3	1	0.1	0.6	4
			MAX	18.0	4.9	22	4.3	57.8	68
			MIN	16.3	4.2	20	4.0	56.1	56
61	35.00	5	AV5	17.9	5.1	23	4.3	56.2	68
			STD	0.7	0.2	1	0.1	0.7	6
			MAX	18.8	5.3	23	4.4	57.2	75
			MIN	16.9	4.8	22	4.1	55.3	58
66	36.00	5	AV5	19.0	5.6	25	4.5	55.1	74
			STD	0.9	0.3	2	0.1	0.9	4
			MAX	20.0	5.9	27	4.6	56.5	78
			MIN	17.5	5.1	23	4.2	54.1	69
72	37.00	6	AV6	19.8	5.9	25	4.6	54.2	98
			STD	0.4	0.1	1	0.1	0.4	4
			MAX	20.7	6.0	27	4.8	54.7	104
			MIN	19.3	5.8	24	4.5	53.4	93
78	38.00	6	AV6	20.1	6.0	25	4.7	54.1	104
			STD	0.3	0.2	1	0.1	0.4	2
			MAX	20.5	6.5	26	4.8	54.7	107
			MIN	19.8	5.8	24	4.5	53.5	102
84	39.00	6	AV6	21.1	6.3	27	4.8	53.1	108
			STD	0.2	0.2	0	0.1	0.3	2
			MAX	21.4	6.7	28	4.9	53.4	113
			MIN	20.9	6.0	26	4.8	52.6	106
91	40.00	7	AV7	21.3	6.3	26	4.9	52.7	109
			STD	0.3	0.3	1	0.1	0.3	3
			MAX	21.6	6.8	27	5.0	53.1	112
			MIN	20.8	5.9	25	4.8	52.2	103
97	41.00	6	AV6	21.4	6.2	27	5.0	52.5	112
			STD	0.3	0.3	1	0.1	0.3	3
			MAX	21.8	6.7	28	5.0	53.1	116
			MIN	21.0	5.9	26	4.8	52.3	107
102	42.00	5	AV5	21.3	6.3	27	4.9	52.6	113
			STD	0.2	0.3	0	0.0	0.2	4
			MAX	21.6	6.7	27	5.0	53.0	118
			MIN	20.9	5.9	26	4.9	52.3	107
109	43.00	7	AV7	21.4	6.1	26	5.0	52.5	117
			STD	0.4	0.1	1	0.1	0.5	4
			MAX	21.8	6.2	27	5.1	53.4	120
			MIN	20.5	5.9	24	4.8	51.8	111
115	44.00	6	AV6	21.9	6.3	27	5.0	52.1	120
			STD	0.4	0.2	1	0.1	0.4	4
			MAX	22.5	6.7	29	5.1	52.9	125
			MIN	21.1	5.9	26	4.9	51.6	115

USH 10 over Little Lake Butte des Morts - Pier 1 #1
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
122	45.00	7	AV7	21.8	6.4	26	5.0	52.1	119
			STD	0.5	0.2	1	0.1	0.6	6
			MAX	22.6	6.7	27	5.2	53.0	126
			MIN	20.9	6.2	24	4.9	51.4	109
129	46.00	7	AV7	22.3	6.4	26	5.1	51.7	123
			STD	0.6	0.1	1	0.1	0.6	4
			MAX	23.1	6.6	27	5.3	52.7	132
			MIN	21.4	6.3	25	4.9	51.0	118
136	47.00	7	AV7	22.4	6.5	26	5.1	51.6	125
			STD	0.3	0.2	1	0.1	0.3	4
			MAX	22.9	6.9	27	5.2	52.0	130
			MIN	22.0	6.3	26	5.1	51.1	120
145	48.00	9	AV9	22.4	6.5	25	5.2	51.5	126
			STD	0.3	0.1	0	0.1	0.3	2
			MAX	23.0	6.7	25	5.3	51.9	131
			MIN	22.2	6.3	24	5.1	50.9	122
152	49.00	7	AV7	22.4	6.6	26	5.1	51.6	128
			STD	0.8	0.3	1	0.1	0.7	3
			MAX	23.2	7.0	28	5.4	52.8	133
			MIN	21.0	6.2	23	4.9	50.6	124
160	50.00	8	AV8	23.0	6.9	26	5.3	51.0	134
			STD	0.4	0.2	1	0.1	0.4	4
			MAX	23.4	7.3	27	5.4	51.5	140
			MIN	22.2	6.7	25	5.2	50.5	129
168	51.00	8	AV8	23.2	7.3	27	5.3	50.8	137
			STD	0.5	0.2	1	0.1	0.5	5
			MAX	24.1	7.6	29	5.6	51.7	143
			MIN	22.4	7.1	25	5.1	49.7	127
176	52.00	8	AV8	23.3	7.3	27	5.3	50.6	136
			STD	0.3	0.1	1	0.1	0.3	2
			MAX	23.8	7.5	27	5.5	51.0	139
			MIN	23.0	7.0	26	5.3	50.1	132
183	53.00	7	AV5	23.8	7.6	28	5.5	50.1	139
			STD	0.3	0.2	1	0.1	0.4	5
			MAX	24.3	7.9	29	5.6	50.8	146
			MIN	23.4	7.4	27	5.3	49.6	131
191	54.00	8	AV8	23.7	7.6	27	5.4	50.3	137
			STD	0.3	0.1	1	0.1	0.3	3
			MAX	24.3	7.8	28	5.6	50.8	141
			MIN	23.1	7.4	26	5.3	49.7	132
200	55.00	9	AV9	24.0	8.0	27	5.5	50.1	146
			STD	0.5	0.2	1	0.1	0.6	6
			MAX	24.6	8.5	28	5.7	50.9	156
			MIN	23.2	7.8	25	5.3	49.3	139
209	56.00	9	AV9	23.9	8.0	27	5.5	50.0	151
			STD	0.5	0.3	1	0.1	0.4	7
			MAX	24.4	8.4	28	5.6	50.7	167
			MIN	23.0	7.6	25	5.3	49.5	143
219	57.00	10	AV10	23.7	7.9	26	5.4	50.3	160
			STD	0.5	0.2	1	0.1	0.4	7
			MAX	24.3	8.1	28	5.6	51.1	170
			MIN	22.8	7.6	24	5.2	49.7	147

USH 10 over Little Lake Butte des Morts - Pier 1 #1
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
229	58.00	10	AV10	23.6	8.0	26	5.4	50.4	157
			STD	0.4	0.2	1	0.1	0.4	9
			MAX	24.2	8.3	27	5.6	51.1	170
			MIN	23.0	7.7	25	5.2	49.6	145
238	59.00	9	AV9	23.9	8.1	26	5.4	50.3	154
			STD	0.3	0.3	1	0.1	0.3	5
			MAX	24.4	8.6	28	5.5	50.6	161
			MIN	23.5	7.5	25	5.4	49.8	148
247	60.00	9	AV9	24.0	8.1	27	5.5	50.0	154
			STD	0.2	0.2	1	0.1	0.2	6
			MAX	24.5	8.5	28	5.6	50.3	165
			MIN	23.7	7.9	26	5.4	49.6	146
257	61.00	10	AV10	23.8	8.1	26	5.4	50.2	159
			STD	0.3	0.2	1	0.1	0.3	4
			MAX	24.1	8.6	27	5.5	50.8	165
			MIN	23.3	7.9	25	5.3	49.8	151
266	62.00	9	AV9	24.1	8.3	26	5.5	50.0	157
			STD	0.4	0.2	1	0.1	0.4	6
			MAX	24.6	8.6	28	5.6	50.8	168
			MIN	23.2	7.9	24	5.3	49.6	144
275	63.00	9	AV9	24.3	8.4	27	5.5	49.9	154
			STD	0.5	0.2	1	0.1	0.4	5
			MAX	25.0	8.8	28	5.7	50.6	161
			MIN	23.5	8.3	25	5.4	49.3	145
286	64.00	11	AV11	24.1	8.4	26	5.5	50.0	165
			STD	0.6	0.3	1	0.1	0.5	5
			MAX	25.4	9.0	28	5.8	50.7	175
			MIN	23.4	8.0	24	5.3	48.8	156
295	65.00	9	AV9	24.6	9.1	27	5.6	49.5	166
			STD	0.5	0.3	1	0.1	0.4	5
			MAX	25.3	9.4	28	5.7	50.5	173
			MIN	23.6	8.6	24	5.4	49.1	159
308	66.00	13	AV13	25.8	12.2	28	6.0	48.0	196
			STD	1.1	2.1	2	0.3	1.3	13
			MAX	27.1	15.1	31	6.4	50.7	210
			MIN	23.6	8.7	24	5.3	46.5	169
319	67.00	11	AV11	25.5	10.4	28	5.9	48.4	191
			STD	0.4	0.6	1	0.1	0.5	4
			MAX	26.3	12.0	29	6.1	49.2	199
			MIN	24.8	9.9	27	5.7	47.7	183
332	68.00	13	AV13	25.8	10.6	27	5.9	48.3	186
			STD	0.6	0.8	1	0.1	0.5	4
			MAX	26.7	12.2	28	6.1	49.5	194
			MIN	24.5	9.7	25	5.6	47.5	180
348	69.00	16	AV16	26.7	12.8	28	6.2	47.2	200
			STD	0.4	0.7	1	0.1	0.4	6
			MAX	27.5	14.0	30	6.4	47.8	211
			MIN	26.2	11.8	27	6.0	46.6	189
368	70.00	20	AV20	27.9	15.5	28	6.5	46.1	247
			STD	0.4	1.1	1	0.1	0.4	27
			MAX	28.8	17.6	31	6.8	46.7	295
			MIN	27.4	13.9	27	6.3	45.1	210

USH 10 over Little Lake Butte des Morts - Pier 1 #1
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

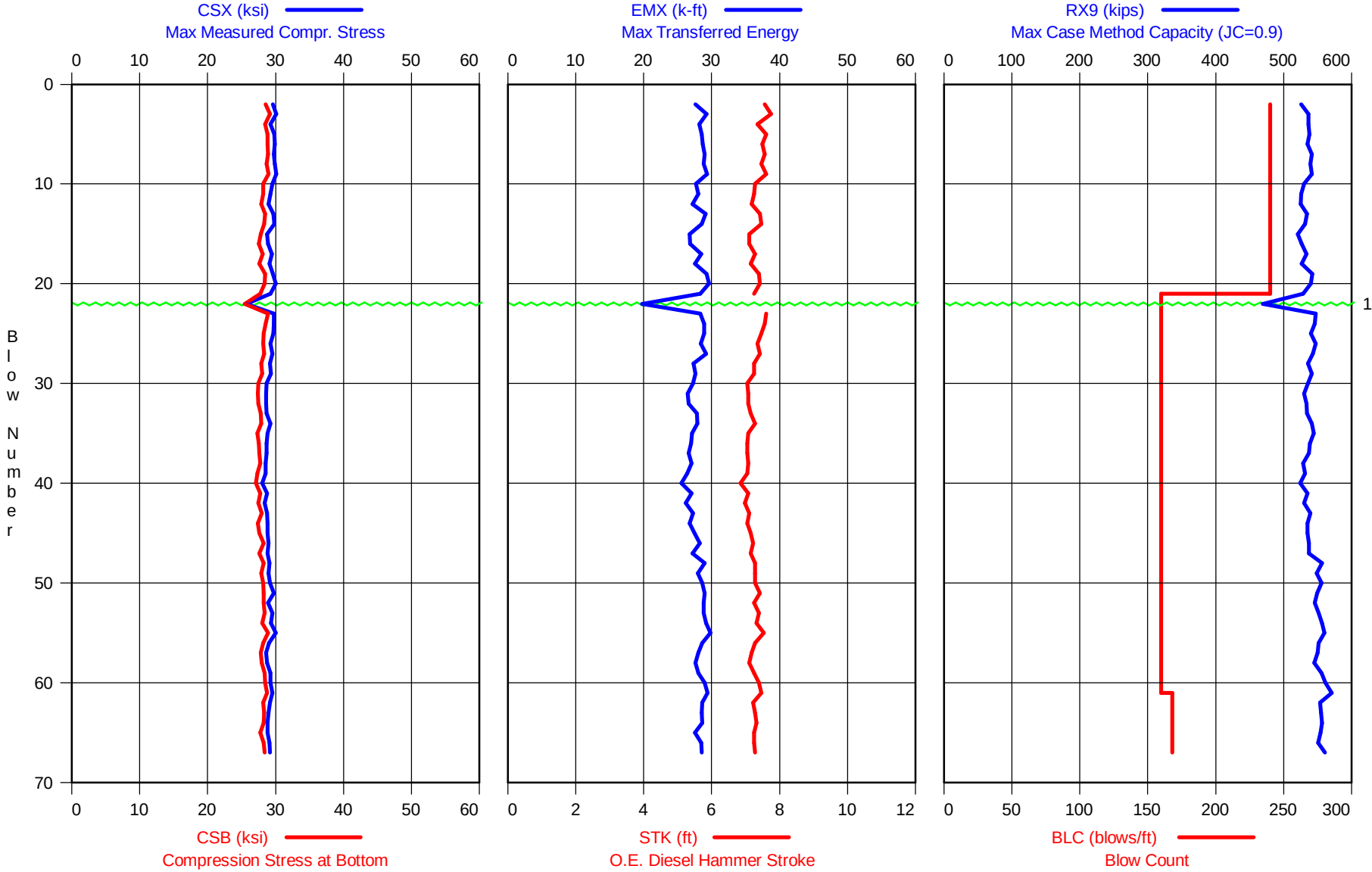
BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
396	71.00	28	AV28	28.7	18.1	29	6.8	45.1	318
			STD	0.4	0.3	1	0.1	0.3	8
			MAX	29.6	18.7	31	7.1	45.7	334
			MIN	27.7	17.5	27	6.6	44.1	300
433	72.00	37	AV37	29.6	21.0	30	7.1	44.4	396
			STD	0.5	0.9	1	0.1	0.5	19
			MAX	30.6	22.7	32	7.4	45.4	420
			MIN	28.4	19.1	28	6.7	43.5	346
486	73.00	53	AV53	29.8	23.0	31	7.1	44.4	441
			STD	0.4	1.3	1	0.1	0.3	26
			MAX	30.6	25.6	32	7.3	45.1	502
			MIN	28.9	21.4	29	6.8	43.6	411
508	73.33	66	AV22	30.3	26.4	32	7.2	43.9	515
			STD	0.4	0.4	1	0.1	0.3	11
			MAX	31.1	27.5	33	7.5	44.4	535
			MIN	29.7	25.7	30	7.0	43.2	495
518	73.46	80	AV10	31.0	28.1	33	7.4	43.3	545
			STD	0.4	0.5	1	0.1	0.4	5
			MAX	31.8	28.8	34	7.7	43.7	556
			MIN	30.6	27.2	32	7.3	42.6	539
Average				24.8	12.1	27	5.8	49.4	219
Std. Dev.				4.3	7.3	4	1.0	4.5	146
Maximum				31.8	28.8	46	7.7	67.8	556
Minimum				8.6	1.5	11	2.9	42.6	0
Total number of blows analyzed: 516									

BL#	depth (ft)	Comments
1	3.00	Reported excavation reference grade at El. 749

Time Summary

Drive 17 minutes 16 seconds 1:22:46 PM - 1:40:02 PM (11/19/2014) BN 1 - 518

USH 10 over Little Lake Butte des Morts - Pier 1 #1 Restrike
APE D30-42, HP 14 x 73



1 - End of restrike. Continue driving

USH 10 over Little Lake Butte des Morts - Pier 1 #1 Restrike
OP: MR

APE D30-42, HP 14 x 73
Test date: 20-Nov-2014

AR: 21.40 in² SP: 0.492 k/ft³
LE: 77.50 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 1.20

CSX: Max Measured Compr. Stress STK: O.E. Diesel Hammer Stroke
CSB: Compression Stress at Bottom BPM: Blows per Minute
EMX: Max Transferred Energy RX9: Max Case Method Capacity (JC=0.9)

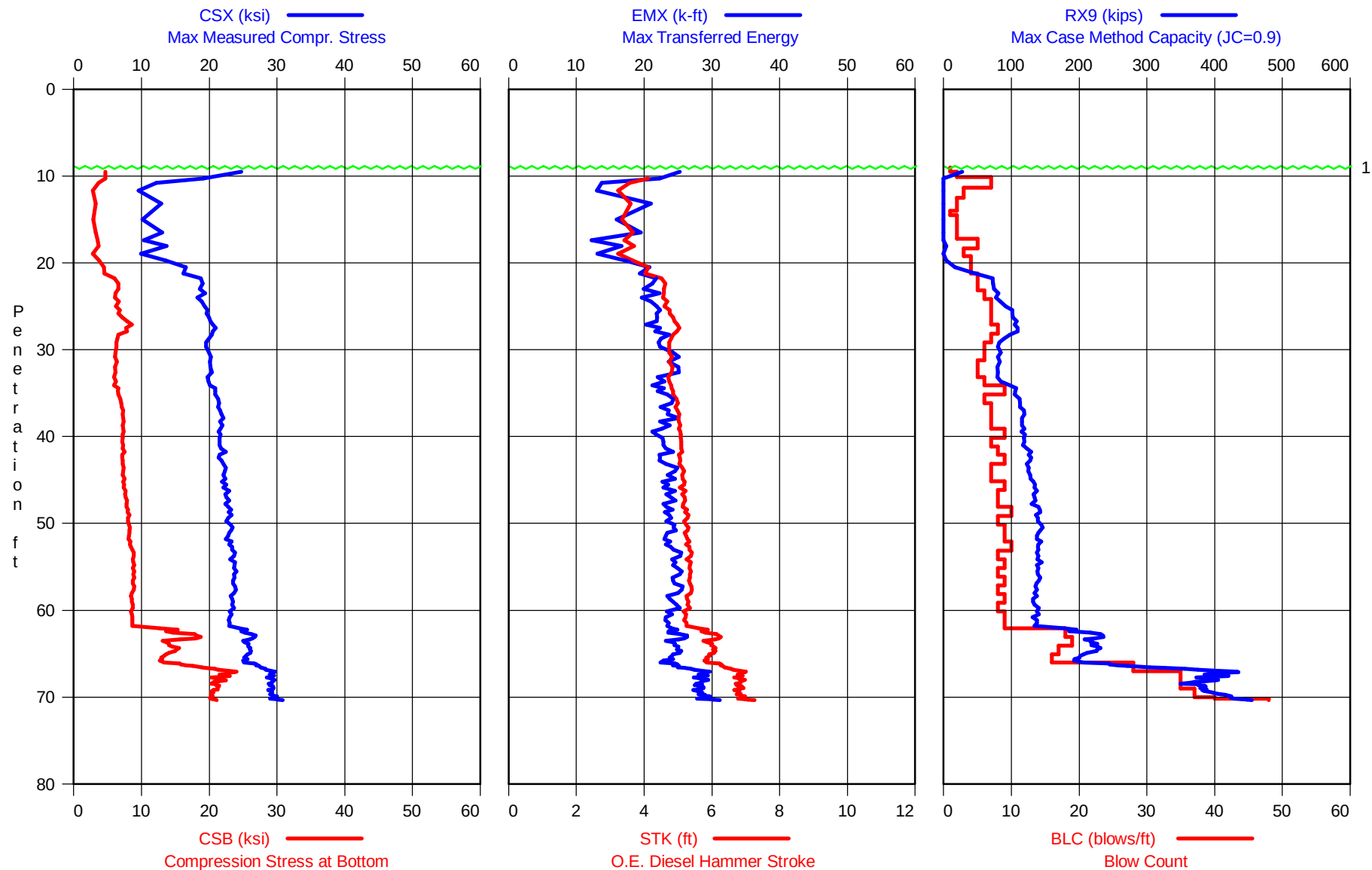
BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9
end	ft	bl/ft		ksi	ksi	k-ft	ft	**	kips
10	73.50	240	AV9	29.8	28.7	29	7.5	43.0	536
			STD	0.3	0.3	1	0.1	0.4	5
			MAX	30.1	29.2	29	7.8	43.7	542
			MIN	29.2	28.1	28	7.3	42.4	526
20	73.54	240	AV10	29.4	28.1	28	7.3	43.7	531
			STD	0.4	0.3	1	0.1	0.4	7
			MAX	30.0	28.5	30	7.5	44.2	542
			MIN	28.8	27.6	27	7.1	43.2	521
30	73.60	160	AV10	29.0	27.9	27	7.4	43.5	534
			STD	1.2	0.9	3	0.2	0.5	22
			MAX	29.7	28.9	29	7.6	44.4	548
			MIN	25.7	25.4	20	7.0	42.8	469
40	73.67	160	AV10	28.6	27.5	27	7.1	44.3	535
			STD	0.3	0.2	1	0.1	0.3	6
			MAX	29.2	27.9	28	7.3	45.0	544
			MIN	28.0	27.1	26	6.9	43.7	524
50	73.73	160	AV10	28.8	27.8	28	7.2	44.1	541
			STD	0.2	0.3	1	0.1	0.3	9
			MAX	29.1	28.2	29	7.3	44.6	557
			MIN	28.4	27.4	26	7.0	43.7	530
60	73.79	160	AV10	29.2	28.3	29	7.3	43.6	553
			STD	0.4	0.3	1	0.1	0.3	5
			MAX	30.0	28.9	30	7.5	44.2	562
			MIN	28.6	27.8	28	7.1	43.0	545
67	73.83	168	AV7	29.1	28.3	29	7.3	43.7	558
			STD	0.2	0.3	0	0.1	0.2	6
			MAX	29.5	28.8	29	7.5	43.9	571
			MIN	28.8	27.8	28	7.2	43.2	551
Average				29.1	28.1	28	7.3	43.7	540
Std. Dev.				0.6	0.6	1	0.2	0.5	14
Maximum				30.1	29.2	30	7.8	45.0	571
Minimum				25.7	25.4	20	6.9	42.4	469

Total number of blows analyzed: 66

BL#	depth (ft)	Comments
22	73.55	End of restrike. Continue driving

Time Summary

Drive 4 minutes 46 seconds 8:07:39 AM - 8:12:25 AM (11/20/2014) BN 1 - 67

USH 10 over Little Lake Butte des Morts - Pier 1 #36
APE D30-42, HP 14 x 73

USH 10 over Little Lake Butte des Morts - Pier 1 #36
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

AR: 21.40 in²
LE: 77.50 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft³
EM: 30,000 ksi
JC: 1.20

CSX: Max Measured Compr. Stress
CSB: Compression Stress at Bottom
EMX: Max Transferred Energy

STK: O.E. Diesel Hammer Stroke
BPM: Blows per Minute
RX9: Max Case Method Capacity (JC=0.9)

BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
1	9.00	1	AV1	24.3	3.4	27	**	**	0
			MAX	24.3	3.4	27	**	**	0
			MIN	24.3	3.4	27	**	**	0
3	10.00	2	AV2	25.0	5.3	24	**	**	42
			STD	0.1	0.1	2	**	**	6
			MAX	25.1	5.4	26	**	**	47
			MIN	24.8	5.2	22	**	**	36
10	11.00	7	AV6	15.7	4.2	18	3.8	59.7	0
			STD	4.8	0.6	6	0.4	2.4	0
			MAX	25.0	5.0	29	4.5	61.6	0
			MIN	11.9	3.1	13	3.5	55.0	0
13	12.00	3	AV3	9.6	2.8	13	3.2	64.1	0
			STD	1.2	0.2	1	0.1	0.9	0
			MAX	11.3	3.1	14	3.3	65.3	0
			MIN	8.6	2.6	12	3.1	63.4	0
15	13.00	2	AV2	12.8	3.3	19	3.6	61.3	0
			STD	1.4	0.2	2	0.2	1.6	0
			MAX	14.1	3.5	21	3.8	62.9	0
			MIN	11.4	3.1	18	3.4	59.7	0
16	14.00	1	AV1	13.3	3.0	24	3.7	60.2	0
			MAX	13.3	3.0	24	3.7	60.2	0
			MIN	13.3	3.0	24	3.7	60.2	0
18	15.00	2	AV2	9.7	2.8	15	3.3	63.4	0
			STD	1.1	0.2	1	0.1	1.0	0
			MAX	10.8	3.0	16	3.4	64.4	0
			MIN	8.6	2.7	15	3.2	62.4	0
20	16.00	2	AV2	12.5	3.3	20	3.6	61.0	0
			STD	1.5	0.3	2	0.2	1.4	0
			MAX	14.0	3.6	22	3.8	62.4	0
			MIN	11.0	3.0	18	3.4	59.6	0
22	17.00	2	AV2	12.6	3.1	18	3.6	60.8	0
			STD	1.2	0.1	2	0.2	1.3	0
			MAX	13.8	3.2	20	3.8	62.0	0
			MIN	11.5	3.0	16	3.5	59.5	0
27	18.00	5	AV5	11.8	3.6	14	3.5	61.5	2
			STD	2.1	0.5	2	0.2	1.9	4
			MAX	14.2	4.3	18	3.7	64.6	11
			MIN	8.6	2.8	11	3.2	59.9	0
30	19.00	3	AV3	11.1	3.0	14	3.4	62.7	0
			STD	1.5	0.2	2	0.2	1.7	0
			MAX	13.1	3.4	17	3.7	64.6	0
			MIN	9.5	2.8	13	3.2	60.5	0
34	20.00	4	AV4	12.6	3.5	16	3.5	61.5	3
			STD	2.2	0.5	2	0.3	2.2	5
			MAX	15.7	4.2	19	4.0	64.5	11
			MIN	9.6	2.9	13	3.2	58.3	0

USH 10 over Little Lake Butte des Morts - Pier 1 #36
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
38	21.00	4	AV4	16.7	4.5	21	4.1	57.1	18
			STD	0.4	0.0	0	0.1	0.5	4
			MAX	17.1	4.5	21	4.2	57.9	22
			MIN	16.1	4.4	20	4.0	56.7	14
43	22.00	5	AV5	17.5	5.4	20	4.3	56.3	67
			STD	1.5	0.8	2	0.3	1.8	10
			MAX	19.1	6.3	23	4.6	58.6	84
			MIN	15.7	4.4	18	3.9	54.5	55
48	23.00	5	AV5	18.8	6.6	21	4.6	54.4	74
			STD	0.5	0.7	1	0.1	0.4	2
			MAX	19.4	7.6	22	4.7	55.0	78
			MIN	17.9	5.7	19	4.5	53.7	71
54	24.00	6	AV6	18.9	6.2	21	4.6	49.2	77
			STD	0.6	0.4	1	0.1	11.8	8
			MAX	19.5	6.7	23	4.7	55.1	89
			MIN	17.7	5.6	19	4.5	22.9	64
61	25.00	7	AV6	19.0	6.4	21	4.7	49.0	86
			STD	0.4	0.5	2	0.1	11.3	5
			MAX	19.5	7.2	24	4.8	54.4	95
			MIN	18.4	5.9	19	4.6	23.7	80
68	26.00	7	AV7	19.6	6.7	22	4.7	53.7	100
			STD	0.4	0.5	1	0.1	0.4	7
			MAX	20.2	7.4	24	4.8	54.6	111
			MIN	19.1	6.1	21	4.6	53.3	92
75	27.00	7	AV7	20.1	7.7	22	4.9	52.8	105
			STD	0.3	0.8	1	0.0	0.2	3
			MAX	20.6	8.8	24	5.0	53.3	109
			MIN	19.8	6.5	21	4.8	52.5	100
83	28.00	8	AV8	20.7	8.0	21	5.0	43.4	108
			STD	0.4	0.6	1	0.1	15.4	5
			MAX	21.1	8.7	23	5.1	52.9	116
			MIN	20.2	7.2	19	4.9	16.0	102
90	29.00	7	AV7	20.1	6.5	23	4.8	53.2	93
			STD	0.4	0.3	1	0.1	0.4	7
			MAX	20.8	7.0	24	4.9	53.7	109
			MIN	19.6	6.2	21	4.7	52.7	87
96	30.00	6	AV5	19.5	6.3	22	4.7	53.6	80
			STD	0.2	0.2	1	0.0	0.2	1
			MAX	19.7	6.8	23	4.8	53.8	81
			MIN	19.3	6.1	21	4.7	53.3	78
102	31.00	6	AV6	20.1	6.2	25	4.8	48.9	82
			STD	0.3	0.1	1	0.1	10.0	3
			MAX	20.5	6.2	26	4.9	53.7	86
			MIN	19.7	6.0	24	4.7	26.6	78
107	32.00	5	AV5	20.1	6.3	24	4.8	53.4	81
			STD	0.3	0.4	1	0.1	0.3	3
			MAX	20.7	6.9	26	4.9	53.6	84
			MIN	19.8	5.9	22	4.7	52.7	79
112	33.00	5	AV5	20.2	6.0	25	4.8	48.1	79
			STD	0.3	0.2	1	0.1	10.7	2
			MAX	20.6	6.2	26	4.8	54.0	83
			MIN	19.6	5.7	23	4.7	26.7	76

USH 10 over Little Lake Butte des Morts - Pier 1 #36
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
118	34.00	6	AV6	19.9	6.1	22	4.7	53.5	83
			STD	0.1	0.2	1	0.0	0.2	2
			MAX	20.0	6.4	24	4.8	53.7	86
			MIN	19.7	5.9	21	4.7	53.3	80
127	35.00	9	AV9	20.7	6.4	22	4.8	45.3	106
			STD	0.4	0.3	1	0.0	14.7	3
			MAX	21.4	7.0	24	4.9	53.5	114
			MIN	20.0	5.8	20	4.8	17.7	100
133	36.00	6	AV6	21.3	6.8	25	4.9	52.5	109
			STD	0.3	0.2	1	0.0	0.2	4
			MAX	21.7	7.0	26	5.0	52.9	115
			MIN	20.8	6.5	23	4.9	52.2	104
140	37.00	7	AV7	21.4	7.1	23	5.0	48.7	114
			STD	0.2	0.2	1	0.0	9.2	3
			MAX	21.5	7.4	25	5.0	52.8	118
			MIN	21.0	6.9	21	4.9	26.1	110
147	38.00	7	AV7	21.9	7.2	24	5.0	47.2	118
			STD	0.3	0.1	1	0.1	12.1	3
			MAX	22.5	7.3	25	5.1	52.5	124
			MIN	21.5	7.1	23	5.0	17.5	114
154	39.00	7	AV7	21.7	7.3	23	5.0	52.1	116
			STD	0.3	0.1	1	0.0	0.2	2
			MAX	22.2	7.5	24	5.1	52.3	120
			MIN	21.3	7.2	21	5.0	51.6	112
163	40.00	9	AV9	21.6	7.3	22	5.1	41.2	118
			STD	0.4	0.1	1	0.0	15.4	3
			MAX	22.2	7.5	24	5.2	52.2	122
			MIN	21.1	7.1	20	5.0	15.9	114
170	41.00	7	AV7	21.5	7.2	23	5.1	46.9	118
			STD	0.3	0.1	1	0.0	12.1	3
			MAX	21.9	7.4	24	5.2	52.0	122
			MIN	21.1	7.0	22	5.1	17.3	111
178	42.00	8	AV8	21.9	7.3	23	5.1	46.9	124
			STD	0.6	0.2	1	0.1	12.1	5
			MAX	23.2	7.8	25	5.2	52.5	137
			MIN	21.2	7.0	22	5.0	17.2	118
187	43.00	9	AV9	21.7	7.2	22	5.1	45.2	128
			STD	0.5	0.2	1	0.0	12.8	5
			MAX	22.3	7.4	23	5.1	52.1	136
			MIN	20.7	7.0	21	5.0	17.2	120
194	44.00	7	AV7	22.4	7.3	25	5.1	51.7	125
			STD	0.4	0.1	1	0.1	0.4	3
			MAX	23.1	7.5	26	5.3	52.2	129
			MIN	22.0	7.2	23	5.0	51.0	119
201	45.00	7	AV7	22.2	7.3	24	5.1	48.0	127
			STD	0.5	0.2	1	0.1	9.0	4
			MAX	22.6	7.6	25	5.2	52.1	133
			MIN	21.1	7.0	22	5.0	25.9	121
210	46.00	9	AV9	22.2	7.4	23	5.1	45.9	134
			STD	0.4	0.1	1	0.1	10.8	4
			MAX	22.8	7.6	24	5.3	52.6	142
			MIN	21.3	7.2	22	4.9	25.6	126

USH 10 over Little Lake Butte des Morts - Pier 1 #36
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
218	47.00	8	AV8	22.6	7.6	24	5.2	51.4	135
			STD	0.4	0.1	1	0.1	0.4	3
			MAX	23.1	7.8	25	5.2	52.3	139
			MIN	21.8	7.5	23	5.0	51.1	129
226	48.00	8	AV8	22.6	7.8	24	5.2	51.4	133
			STD	0.3	0.1	1	0.0	0.2	3
			MAX	23.0	7.9	25	5.2	51.8	138
			MIN	22.2	7.5	22	5.1	51.2	129
236	49.00	10	AV10	23.1	8.0	23	5.2	51.2	141
			STD	0.4	0.2	1	0.1	0.3	4
			MAX	23.5	8.3	25	5.3	51.7	145
			MIN	22.5	7.8	22	5.1	50.7	136
244	50.00	8	AV8	22.8	8.0	24	5.2	47.9	140
			STD	0.3	0.1	1	0.1	8.4	5
			MAX	23.5	8.1	25	5.3	51.7	146
			MIN	22.2	7.9	23	5.1	25.7	134
253	51.00	9	AV9	23.4	8.3	25	5.3	50.9	144
			STD	0.2	0.1	0	0.1	0.3	3
			MAX	23.7	8.4	26	5.4	51.8	148
			MIN	23.2	8.1	24	5.1	50.5	138
262	52.00	9	AV9	22.8	8.2	23	5.3	51.1	139
			STD	0.4	0.1	1	0.1	0.5	4
			MAX	23.7	8.4	25	5.4	51.7	145
			MIN	22.3	8.1	22	5.1	50.4	133
272	53.00	10	AV10	23.1	8.4	24	5.3	50.9	141
			STD	0.6	0.2	1	0.1	0.3	4
			MAX	24.1	8.7	25	5.4	51.4	146
			MIN	21.8	8.1	21	5.2	50.3	135
280	54.00	8	AV8	23.6	8.8	25	5.4	50.5	138
			STD	0.4	0.1	0	0.1	0.3	2
			MAX	24.1	9.0	26	5.4	51.0	141
			MIN	23.1	8.6	25	5.3	50.2	136
289	55.00	9	AV9	23.6	8.8	24	5.3	50.7	140
			STD	0.4	0.1	1	0.1	0.4	4
			MAX	24.2	9.0	25	5.5	51.4	148
			MIN	22.7	8.6	24	5.2	50.0	134
297	56.00	8	AV8	23.8	8.8	25	5.4	50.5	139
			STD	0.2	0.1	0	0.0	0.2	4
			MAX	24.3	9.0	26	5.4	50.8	144
			MIN	23.6	8.6	25	5.3	50.3	134
306	57.00	9	AV9	23.6	8.8	24	5.3	50.7	140
			STD	0.3	0.1	0	0.1	0.3	5
			MAX	24.0	9.0	25	5.4	51.1	148
			MIN	23.2	8.6	24	5.2	50.2	133
314	58.00	8	AV8	23.9	8.9	26	5.4	50.4	137
			STD	0.3	0.1	1	0.1	0.3	3
			MAX	24.4	9.0	27	5.5	51.0	140
			MIN	23.2	8.6	24	5.3	49.9	131
323	59.00	9	AV9	23.4	8.5	24	5.3	50.9	134
			STD	0.4	0.1	1	0.1	0.3	3
			MAX	23.8	8.7	25	5.4	51.4	140
			MIN	22.5	8.2	23	5.2	50.5	130

USH 10 over Little Lake Butte des Morts - Pier 1 #36
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
331	60.00	8	AV8	23.4	8.7	25	5.3	50.9	136
			STD	0.3	0.2	1	0.1	0.3	5
			MAX	23.9	8.9	25	5.4	51.5	144
			MIN	23.0	8.4	24	5.2	50.4	129
340	61.00	9	AV9	23.1	8.6	24	5.2	51.3	137
			STD	0.5	0.1	1	0.1	0.5	6
			MAX	23.8	8.8	25	5.4	51.9	145
			MIN	22.3	8.4	22	5.1	50.5	126
349	62.00	9	AV9	23.0	8.7	23	5.2	51.1	138
			STD	0.3	0.3	1	0.1	0.4	6
			MAX	23.6	9.6	24	5.4	51.6	150
			MIN	22.6	8.5	23	5.1	50.3	128
367	63.00	18	AV18	25.7	15.9	25	5.9	48.2	212
			STD	0.9	2.2	1	0.2	0.9	21
			MAX	27.5	19.0	28	6.3	49.7	243
			MIN	23.9	12.4	23	5.6	46.7	177
386	64.00	19	AV19	25.8	15.3	25	6.0	47.9	221
			STD	0.6	2.2	1	0.2	0.7	10
			MAX	26.9	19.1	27	6.3	49.4	238
			MIN	24.6	12.4	22	5.6	46.8	192
403	65.00	17	AV17	26.0	14.7	25	6.1	47.7	224
			STD	0.3	0.7	1	0.1	0.3	9
			MAX	26.7	15.8	26	6.3	48.2	244
			MIN	25.4	13.6	24	5.9	47.0	207
419	66.00	16	AV16	25.3	13.1	24	5.9	47.0	198
			STD	0.4	0.4	1	0.1	5.9	6
			MAX	26.1	13.8	26	6.1	49.3	207
			MIN	24.4	12.6	21	5.7	24.1	190
447	67.00	28	AV28	27.6	18.6	26	6.4	46.5	306
			STD	1.0	2.6	2	0.2	0.8	58
			MAX	29.9	23.3	30	7.0	48.4	423
			MIN	25.0	14.0	22	5.9	44.5	220
482	68.00	35	AV35	29.3	22.2	29	6.9	45.0	401
			STD	0.4	1.1	1	0.1	0.4	21
			MAX	30.1	24.7	31	7.1	46.0	442
			MIN	28.1	20.2	26	6.5	44.2	371
517	69.00	35	AV35	29.3	21.2	28	6.8	45.0	379
			STD	0.3	0.6	1	0.1	0.3	15
			MAX	29.8	22.6	30	7.0	45.7	411
			MIN	28.5	20.2	26	6.6	44.4	344
554	70.00	37	AV37	29.3	20.5	28	6.8	45.1	401
			STD	0.4	0.4	1	0.1	0.4	15
			MAX	30.4	21.4	30	7.1	45.9	426
			MIN	28.3	20.0	27	6.6	44.3	379
559	70.12	40	AV5	29.1	20.1	28	6.8	45.1	423
			STD	0.5	0.2	1	0.1	0.4	3
			MAX	29.6	20.4	29	6.9	45.9	428
			MIN	28.1	19.8	26	6.6	44.7	419
569	70.33	48	AV10	30.1	20.8	30	7.0	44.4	444
			STD	0.5	0.3	1	0.1	0.4	8
			MAX	31.1	21.2	31	7.4	45.0	456
			MIN	29.5	20.0	28	6.9	43.5	432

USH 10 over Little Lake Butte des Morts - Pier 1 #36
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

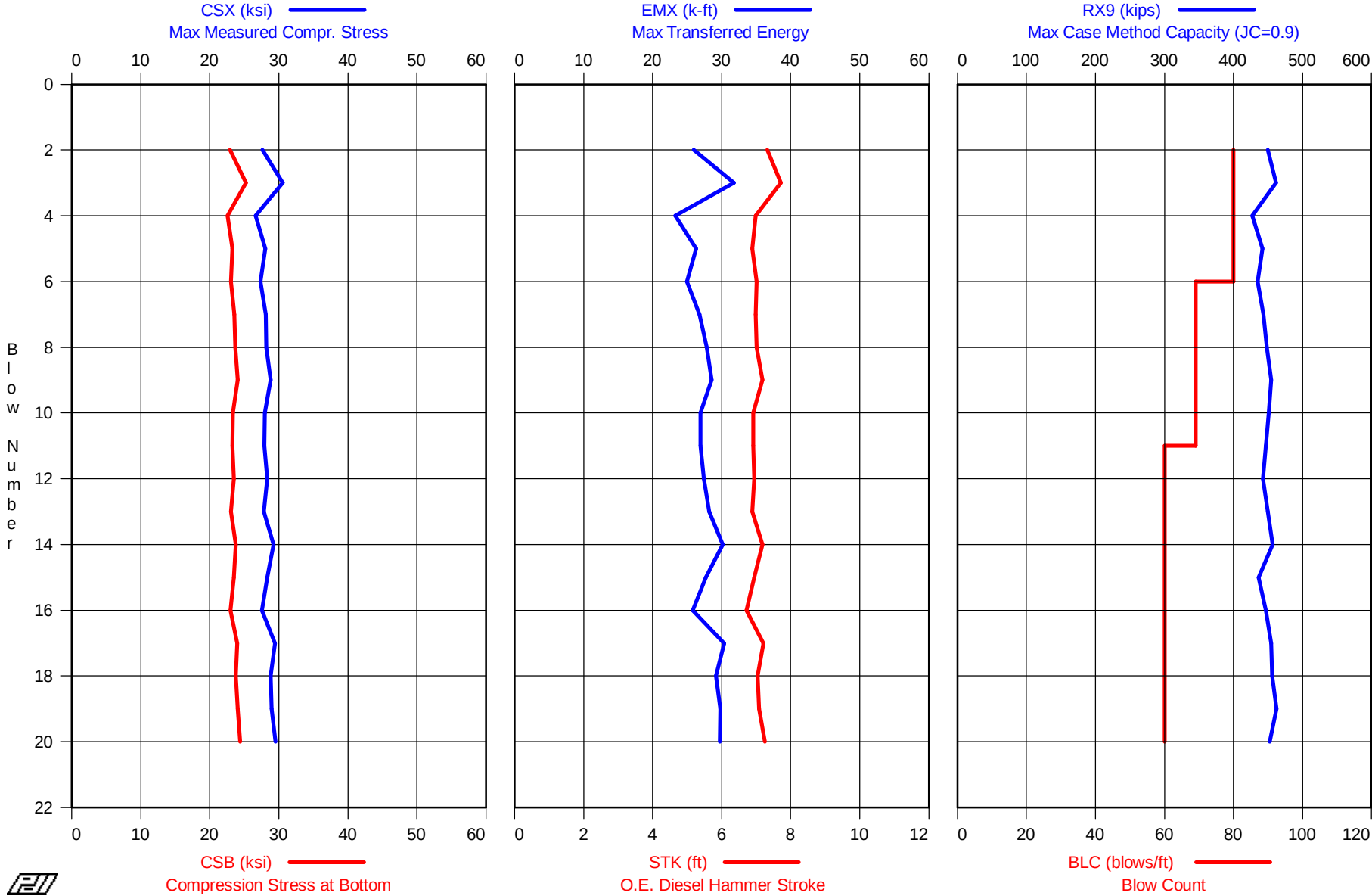
	CSX	CSB	EMX	STK	BPM	RX9
	ksi	ksi	k-ft	ft	**	kips
Average	23.7	11.7	24	5.6	49.0	194
Std. Dev.	4.4	6.2	3	0.9	6.9	125
Maximum	31.1	24.7	31	7.4	65.3	456
Minimum	8.6	2.6	11	3.1	15.9	0
Total number of blows analyzed: 566						

BL#	depth (ft)	Comments
1	9.00	Reported excavation reference grade at El. 749

Time Summary

Drive	12 minutes 19 seconds	12:46:19 PM - 12:58:38 PM (11/19/2014) BN 1 - 569
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USH 10 over Little Lake Butte des Morts - Pier 1 #36 Restrike
APE D30-42, HP 14 x 73



USH 10 over Little Lake Butte des Morts - Pier 1 #36 Restrike
OP: MR

APE D30-42, HP 14 x 73
Test date: 20-Nov-2014

AR: 21.40 in² SP: 0.492 k/ft³
LE: 77.50 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 1.20

CSX: Max Measured Compr. Stress STK: O.E. Diesel Hammer Stroke
CSB: Compression Stress at Bottom BPM: Blows per Minute
EMX: Max Transferred Energy RX9: Max Case Method Capacity (JC=0.9)

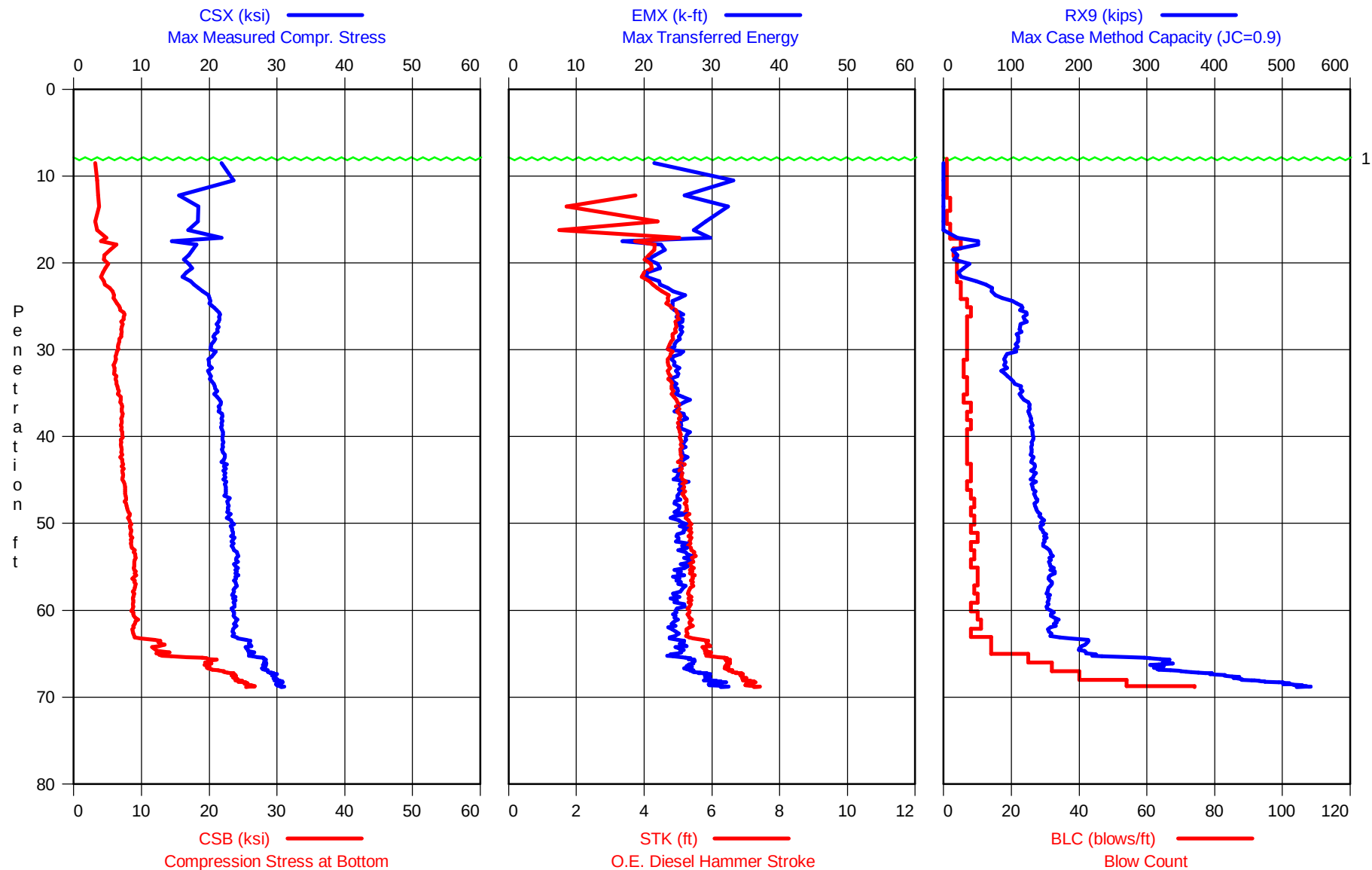
BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9
end	ft	bl/ft		ksi	ksi	k-ft	ft	**	kips
5	70.40	80	AV4	28.2	23.5	27	7.2	43.9	445
			STD	1.4	1.0	3	0.3	0.9	12
			MAX	30.5	25.2	32	7.7	44.9	461
			MIN	26.6	22.5	23	6.9	42.5	427
10	70.47	69	AV5	28.1	23.5	27	7.0	44.5	446
			STD	0.5	0.3	1	0.1	0.3	7
			MAX	28.8	24.0	29	7.2	44.8	455
			MIN	27.4	23.1	25	6.9	44.0	435
15	70.55	60	AV5	28.3	23.4	28	7.0	44.6	447
			STD	0.5	0.2	1	0.1	0.3	7
			MAX	29.2	23.8	30	7.2	44.9	456
			MIN	27.8	23.0	27	6.9	44.0	437
20	70.64	60	AV5	28.8	23.8	29	7.1	44.4	454
			STD	0.7	0.5	2	0.2	0.6	5
			MAX	29.5	24.4	30	7.2	45.4	462
			MIN	27.5	23.0	26	6.7	43.8	447
Average				28.4	23.6	28	7.1	44.4	448
Std. Dev.				0.9	0.6	2	0.2	0.6	9
Maximum				30.5	25.2	32	7.7	45.4	462
Minimum				26.6	22.5	23	6.7	42.5	427

Total number of blows analyzed: 19

Time Summary

Drive 25 seconds

7:33:49 AM - 7:34:14 AM (11/20/2014) BN 1 - 20

USH 10 over Little Lake Butte des Morts - Pier 1 #44
APE D30-42, HP 14 x 73

USH 10 over Little Lake Butte des Morts - Pier 1 #44
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

AR: 21.40 in² SP: 0.492 k/ft³
LE: 77.50 ft EM: 30,000 ksi
WS: 16,807.9 f/s JC: 1.20

CSX: Max Measured Compr. Stress STK: O.E. Diesel Hammer Stroke
CSB: Compression Stress at Bottom BPM: Blows per Minute
EMX: Max Transferred Energy RX9: Max Case Method Capacity (JC=0.9)

BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
1	8.00	1	AV1	20.9	3.5	18	**	**	0
			MAX	20.9	3.5	18	**	**	0
			MIN	20.9	3.5	18	**	**	0
2	9.00	1	AV1	22.6	2.8	25	**	**	0
			MAX	22.6	2.8	25	**	**	0
			MIN	22.6	2.8	25	**	**	0
3	10.00	1	AV1	23.5	3.1	27	**	**	0
			MAX	23.5	3.1	27	**	**	0
			MIN	23.5	3.1	27	**	**	0
4	11.00	1	AV1	23.7	3.9	39	**	**	0
			MAX	23.7	3.9	39	**	**	0
			MIN	23.7	3.9	39	**	**	0
5	12.00	1	AV1	15.4	3.0	30	3.7	60.3	0
			MAX	15.4	3.0	30	3.7	60.3	0
			MIN	15.4	3.0	30	3.7	60.3	0
7	13.00	2	AV2	14.0	3.6	19	3.6	61.0	0
			STD	1.8	0.6	3	0.2	1.6	0
			MAX	15.7	4.2	22	3.8	62.5	0
			MIN	12.2	3.0	16	3.4	59.4	0
8	14.00	1	AV1	24.5	4.5	49	**	**	0
			MAX	24.5	4.5	49	**	**	0
			MIN	24.5	4.5	49	**	**	0
9	15.00	1	AV1	23.0	3.5	40	5.3	50.7	0
			MAX	23.0	3.5	40	5.3	50.7	0
			MIN	23.0	3.5	40	5.3	50.7	0
11	16.00	2	AV2	11.5	2.7	15	3.2	64.1	0
			STD	2.2	0.1	3	0.2	2.1	0
			MAX	13.6	2.8	18	3.5	66.2	0
			MIN	9.3	2.6	12	3.0	62.0	0
13	17.00	2	AV2	25.2	4.7	42	6.1	47.7	0
			STD	0.7	0.3	1	0.0	0.0	0
			MAX	25.9	5.0	43	6.1	47.7	0
			MIN	24.5	4.4	41	6.1	47.7	0
18	18.00	5	AV5	16.6	5.0	19	4.0	57.9	49
			STD	1.7	1.1	3	0.3	1.8	4
			MAX	18.5	6.9	23	4.4	59.9	52
			MIN	14.4	3.8	16	3.7	55.5	41
21	19.00	3	AV3	17.3	5.2	23	4.2	56.5	11
			STD	0.4	0.4	1	0.1	0.6	3
			MAX	17.9	5.6	24	4.4	57.1	14
			MIN	16.9	4.7	22	4.1	55.7	7
25	20.00	4	AV4	16.8	4.7	21	4.1	57.3	26
			STD	0.5	0.6	1	0.1	0.7	11
			MAX	17.4	5.5	22	4.3	58.2	40
			MIN	16.1	3.9	20	4.0	56.4	13

USH 10 over Little Lake Butte des Morts - Pier 1 #44
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
29	21.00	4	AV4	17.0	4.6	22	4.1	57.1	28
			STD	0.5	0.2	1	0.1	0.7	9
			MAX	17.8	4.7	23	4.3	58.2	37
			MIN	16.5	4.3	21	4.0	56.2	14
33	22.00	4	AV4	16.4	4.2	21	4.0	58.1	30
			STD	0.7	0.3	1	0.1	0.9	5
			MAX	17.0	4.5	22	4.1	59.6	37
			MIN	15.2	3.8	19	3.8	57.4	23
38	23.00	5	AV5	18.0	4.8	23	4.3	56.1	65
			STD	0.4	0.4	1	0.1	0.5	7
			MAX	18.5	5.5	24	4.4	56.8	77
			MIN	17.3	4.4	22	4.2	55.6	59
43	24.00	5	AV5	19.5	5.8	25	4.6	54.2	75
			STD	0.5	0.2	1	0.1	0.5	5
			MAX	20.3	6.0	26	4.8	54.8	82
			MIN	19.0	5.6	24	4.5	53.4	70
50	25.00	7	AV7	20.2	6.4	24	4.7	53.7	106
			STD	0.3	0.2	0	0.1	0.3	7
			MAX	20.6	6.8	25	4.8	54.2	116
			MIN	19.8	6.0	24	4.6	53.3	94
58	26.00	8	AV8	21.2	7.2	25	4.9	52.6	119
			STD	0.4	0.3	1	0.1	0.4	5
			MAX	21.7	7.5	26	5.0	53.3	127
			MIN	20.7	6.7	24	4.8	52.2	112
65	27.00	7	AV7	21.4	7.2	25	5.0	52.4	120
			STD	0.4	0.2	1	0.1	0.4	6
			MAX	22.2	7.6	27	5.1	53.0	128
			MIN	20.7	6.9	24	4.9	51.8	108
72	28.00	7	AV7	21.2	7.1	25	4.9	52.6	113
			STD	0.1	0.1	0	0.0	0.1	3
			MAX	21.4	7.4	26	5.0	52.7	116
			MIN	21.0	7.0	25	4.9	52.5	108
79	29.00	7	AV7	20.8	6.8	25	4.8	53.1	110
			STD	0.2	0.2	0	0.0	0.2	3
			MAX	21.0	7.0	26	4.9	53.4	114
			MIN	20.4	6.5	25	4.8	52.8	106
86	30.00	7	AV7	20.3	6.6	24	4.7	53.6	107
			STD	0.3	0.2	1	0.1	0.4	2
			MAX	20.8	7.0	25	4.8	54.2	110
			MIN	19.9	6.4	23	4.6	53.2	103
93	31.00	7	AV7	20.5	6.3	25	4.8	53.4	97
			STD	0.6	0.1	1	0.1	0.4	7
			MAX	21.3	6.5	26	4.9	54.0	110
			MIN	19.4	6.1	23	4.7	52.8	88
99	32.00	6	AV6	20.2	6.1	25	4.7	53.6	92
			STD	0.4	0.1	0	0.1	0.3	6
			MAX	20.9	6.3	26	4.9	53.9	102
			MIN	19.8	5.9	24	4.7	53.0	85
105	33.00	6	AV6	20.0	6.0	25	4.7	53.8	88
			STD	0.3	0.1	1	0.1	0.3	2
			MAX	20.2	6.2	26	4.8	54.4	92
			MIN	19.4	5.9	24	4.6	53.3	85

USH 10 over Little Lake Butte des Morts - Pier 1 #44
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
112	34.00	7	AV7	20.4	6.3	24	4.8	53.4	103
			STD	0.3	0.1	0	0.1	0.3	3
			MAX	20.9	6.4	25	4.9	53.9	109
			MIN	19.9	6.1	23	4.7	52.9	97
119	35.00	7	AV7	20.9	6.5	25	4.8	53.2	114
			STD	0.3	0.1	1	0.1	0.3	2
			MAX	21.2	6.6	26	4.9	53.7	117
			MIN	20.4	6.3	24	4.7	52.7	111
125	36.00	6	AV6	21.4	6.9	26	4.9	52.6	117
			STD	0.3	0.1	1	0.0	0.2	4
			MAX	21.8	7.1	27	5.0	53.0	123
			MIN	21.0	6.6	26	4.9	52.3	112
133	37.00	8	AV8	21.5	7.1	25	5.0	52.3	126
			STD	0.2	0.1	1	0.1	0.3	2
			MAX	21.8	7.2	26	5.1	52.7	128
			MIN	21.0	6.9	23	4.9	51.9	123
140	38.00	7	AV7	21.9	7.1	26	5.0	52.0	128
			STD	0.2	0.2	0	0.0	0.2	2
			MAX	22.3	7.3	27	5.1	52.3	130
			MIN	21.5	6.9	26	5.0	51.8	126
148	39.00	8	AV8	21.8	7.1	25	5.0	52.1	130
			STD	0.2	0.1	0	0.0	0.2	2
			MAX	22.1	7.2	26	5.1	52.4	133
			MIN	21.6	6.8	25	5.0	51.9	125
155	40.00	7	AV7	21.9	7.1	26	5.0	52.1	131
			STD	0.3	0.1	1	0.1	0.3	2
			MAX	22.4	7.4	27	5.1	52.6	134
			MIN	21.4	7.0	26	4.9	51.6	128
162	41.00	7	AV7	22.1	7.0	26	5.1	51.8	131
			STD	0.2	0.1	1	0.0	0.2	2
			MAX	22.5	7.2	27	5.2	52.0	134
			MIN	21.8	6.9	25	5.1	51.5	128
169	42.00	7	AV7	22.1	7.1	26	5.1	51.8	130
			STD	0.4	0.2	1	0.1	0.4	1
			MAX	22.7	7.3	26	5.2	52.5	132
			MIN	21.4	6.8	25	5.0	51.4	129
176	43.00	7	AV7	22.1	7.1	26	5.1	52.0	130
			STD	0.5	0.2	1	0.1	0.6	3
			MAX	23.0	7.4	27	5.3	52.8	133
			MIN	21.3	6.8	24	4.9	50.9	125
184	44.00	8	AV8	22.3	7.2	25	5.1	51.8	133
			STD	0.3	0.1	1	0.1	0.3	3
			MAX	23.0	7.4	26	5.2	52.2	137
			MIN	22.0	7.1	24	5.0	51.1	125
192	45.00	8	AV8	22.3	7.2	25	5.1	51.7	133
			STD	0.4	0.2	1	0.1	0.3	3
			MAX	22.9	7.6	26	5.2	52.3	140
			MIN	21.7	7.1	24	5.0	51.2	128
199	46.00	7	AV7	22.5	7.5	26	5.2	51.4	132
			STD	0.1	0.1	1	0.0	0.2	3
			MAX	22.6	7.8	27	5.2	51.8	137
			MIN	22.3	7.3	25	5.1	51.1	128

USH 10 over Little Lake Butte des Morts - Pier 1 #44
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
207	47.00	8	AV8	22.6	7.6	25	5.2	51.4	135
			STD	0.5	0.2	0	0.1	0.3	2
			MAX	23.7	8.0	26	5.3	51.8	138
			MIN	22.2	7.4	24	5.1	50.9	131
216	48.00	9	AV9	22.7	7.7	25	5.2	51.2	136
			STD	0.3	0.2	1	0.1	0.4	2
			MAX	23.0	7.9	25	5.4	51.7	141
			MIN	22.3	7.5	24	5.1	50.5	134
224	49.00	8	AV8	22.8	8.1	25	5.3	51.0	139
			STD	0.4	0.2	1	0.1	0.4	3
			MAX	23.4	8.4	27	5.4	51.6	145
			MIN	22.2	7.7	24	5.1	50.4	135
233	50.00	9	AV9	23.1	8.2	25	5.3	50.9	145
			STD	0.4	0.2	1	0.1	0.3	3
			MAX	23.5	8.5	26	5.4	51.2	151
			MIN	22.3	7.8	24	5.2	50.5	141
241	51.00	8	AV8	23.4	8.4	26	5.4	50.6	144
			STD	0.3	0.2	1	0.1	0.3	2
			MAX	23.8	8.6	27	5.4	51.2	150
			MIN	22.9	8.1	25	5.2	50.2	142
251	52.00	10	AV10	23.5	8.5	25	5.4	50.5	150
			STD	0.3	0.1	0	0.0	0.2	2
			MAX	23.9	8.8	26	5.4	51.0	153
			MIN	23.2	8.3	24	5.3	50.3	148
259	53.00	8	AV8	23.4	8.5	26	5.3	50.7	149
			STD	0.3	0.2	1	0.1	0.3	3
			MAX	23.7	8.8	27	5.4	51.2	154
			MIN	22.8	8.3	24	5.2	50.4	146
268	54.00	9	AV9	24.1	9.1	26	5.5	50.1	158
			STD	0.3	0.2	1	0.1	0.3	3
			MAX	24.7	9.3	28	5.6	50.4	165
			MIN	23.6	8.8	25	5.4	49.7	156
276	55.00	8	AV8	23.9	9.0	26	5.4	50.4	157
			STD	0.3	0.1	1	0.1	0.2	1
			MAX	24.4	9.1	27	5.5	50.7	159
			MIN	23.5	8.8	25	5.3	50.0	155
286	56.00	10	AV10	24.1	9.0	25	5.4	50.3	161
			STD	0.4	0.2	1	0.1	0.4	4
			MAX	24.8	9.3	26	5.6	51.2	165
			MIN	23.3	8.6	24	5.2	49.7	154
296	57.00	10	AV10	23.9	8.9	25	5.4	50.3	157
			STD	0.2	0.2	0	0.0	0.2	4
			MAX	24.1	9.2	26	5.5	50.6	165
			MIN	23.6	8.6	24	5.4	50.0	152
305	58.00	9	AV9	23.8	8.9	26	5.4	50.6	155
			STD	0.2	0.2	1	0.1	0.3	3
			MAX	24.3	9.2	26	5.5	51.0	162
			MIN	23.5	8.6	25	5.3	49.9	151
315	59.00	10	AV10	23.6	8.8	24	5.3	50.7	155
			STD	0.3	0.1	1	0.1	0.3	2
			MAX	24.2	9.0	25	5.4	51.0	159
			MIN	23.1	8.6	24	5.3	50.2	150

USH 10 over Little Lake Butte des Morts - Pier 1 #44
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
323	60.00	8	AV8	23.6	8.7	26	5.3	50.7	154
			STD	0.2	0.1	1	0.0	0.2	3
			MAX	23.9	8.9	27	5.4	51.1	158
			MIN	23.1	8.5	25	5.2	50.4	147
333	61.00	10	AV10	23.7	8.9	24	5.3	50.7	162
			STD	0.2	0.3	1	0.0	0.2	4
			MAX	24.1	9.5	26	5.4	51.1	168
			MIN	23.2	8.6	23	5.2	50.4	156
344	62.00	11	AV11	23.9	9.0	24	5.4	50.5	164
			STD	0.3	0.2	1	0.1	0.2	4
			MAX	24.5	9.5	25	5.5	50.8	171
			MIN	23.5	8.6	23	5.3	50.1	157
352	63.00	8	AV8	23.5	8.8	25	5.3	51.0	157
			STD	0.2	0.1	1	0.0	0.2	2
			MAX	24.0	8.9	25	5.3	51.4	160
			MIN	23.2	8.6	23	5.2	50.8	153
366	64.00	14	AV14	25.4	11.8	25	5.7	49.1	203
			STD	0.8	1.6	1	0.2	0.9	16
			MAX	26.4	13.7	27	6.0	50.8	217
			MIN	24.0	8.9	23	5.3	48.1	170
380	65.00	14	AV14	25.9	12.4	25	5.8	48.6	205
			STD	0.5	0.9	1	0.1	0.4	5
			MAX	26.8	15.3	27	6.0	49.6	215
			MIN	24.9	11.3	24	5.6	48.0	195
405	66.00	25	AV25	27.5	17.5	26	6.3	47.0	286
			STD	1.0	3.1	2	0.3	0.9	45
			MAX	28.7	21.6	28	6.6	48.6	341
			MIN	25.8	12.5	23	5.8	45.8	213
437	67.00	32	AV32	28.2	20.2	27	6.5	46.3	322
			STD	0.4	0.8	1	0.1	0.3	13
			MAX	28.8	22.2	28	6.6	47.0	350
			MIN	27.2	19.0	25	6.3	45.7	304
477	68.00	40	AV40	29.5	23.5	29	6.8	45.0	409
			STD	0.5	0.6	1	0.1	0.4	26
			MAX	30.4	24.4	30	7.1	46.2	442
			MIN	28.3	21.8	27	6.5	44.3	351
515	68.70	54	AV38	30.2	25.2	30	7.1	44.2	495
			STD	0.4	0.7	1	0.1	0.4	25
			MAX	31.1	26.8	32	7.3	45.3	536
			MIN	29.1	23.3	28	6.8	43.6	445
525	68.83	74	AV10	30.8	26.3	32	7.3	43.6	535
			STD	0.3	0.5	0	0.1	0.2	7
			MAX	31.3	26.9	33	7.5	43.9	542
			MIN	30.4	25.4	31	7.2	43.2	521
Average				24.1	11.8	26	5.6	50.1	203
Std. Dev.				3.7	7.0	3	0.9	3.6	136
Maximum				31.3	26.9	49	7.5	66.2	542
Minimum				9.3	2.6	12	3.0	43.2	0

Total number of blows analyzed: 525

BL#	depth (ft)	Comments
1	8.00	Reported excavation reference grade at El. 749

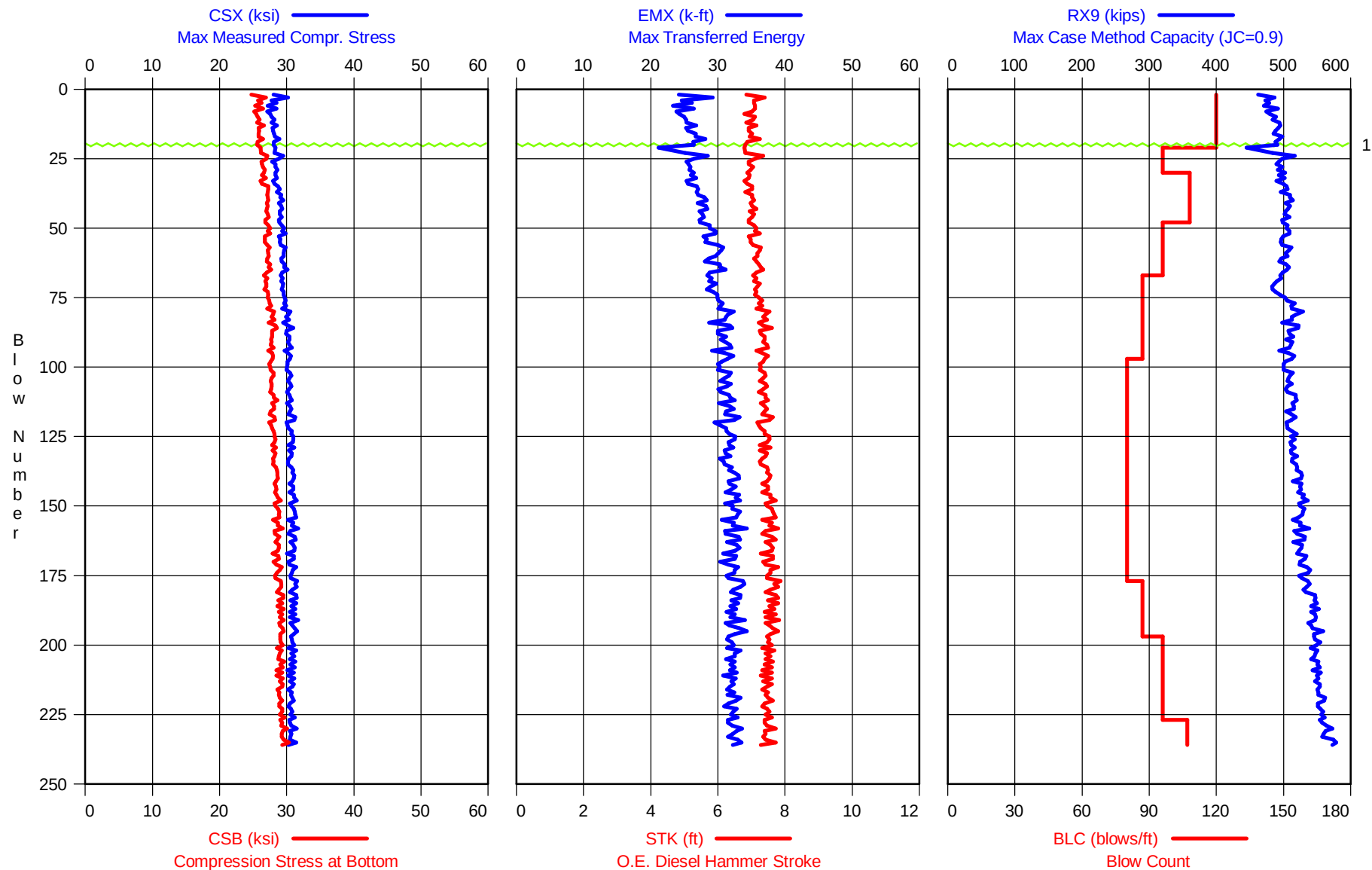
USH 10 over Little Lake Butte des Morts - Pier 1 #44
OP: MR

APE D30-42, HP 14 x 73
Test date: 19-Nov-2014

Time Summary

Drive 13 minutes 21 seconds

11:58:12 AM - 12:11:33 PM (11/19/2014) BN 1 - 525

USH 10 over Little Lake Butte des Morts - Pier 1 #44 Restrike
APE D30-42, HP 14 x 73

1 - End of Restrike. Continue driving

USH 10 over Little Lake Butte des Morts - Pier 1 #44 Restrike

APE D30-42, HP 14 x 73

OP: MR

Test date: 20-Nov-2014

AR: 21.40 in²

SP: 0.492 k/ft³

LE: 77.50 ft

EM: 30,000 ksi

WS: 16,807.9 f/s

JC: 1.20

CSX: Max Measured Compr. Stress

STK: O.E. Diesel Hammer Stroke

CSB: Compression Stress at Bottom

BPM: Blows per Minute

EMX: Max Transferred Energy

RX9: Max Case Method Capacity (JC=0.9)

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9
end	ft	bl/ft		ksi	ksi	k-ft	ft	**	kips
5	68.88	120	AV4	28.6	25.9	26	7.1	44.3	475
			STD	1.0	0.8	2	0.2	0.6	9
			MAX	30.2	26.9	29	7.4	45.0	487
			MIN	27.7	24.7	24	6.9	43.4	462
10	68.92	120	AV5	27.6	25.6	25	7.0	44.5	481
			STD	0.5	0.4	1	0.1	0.4	8
			MAX	28.5	26.4	26	7.1	45.2	492
			MIN	27.1	25.2	23	6.8	44.2	471
15	68.96	120	AV5	28.1	26.0	26	7.0	44.6	491
			STD	0.3	0.3	1	0.1	0.3	4
			MAX	28.5	26.6	27	7.1	45.0	495
			MIN	27.8	25.6	25	6.9	44.1	484
20	69.00	120	AV5	28.3	25.9	27	7.0	44.6	491
			STD	0.3	0.3	1	0.1	0.4	4
			MAX	28.9	26.4	28	7.2	45.1	498
			MIN	28.0	25.6	26	6.8	43.8	485
29	69.09	96	AV8	28.5	26.5	25	7.0	44.6	490
			STD	0.5	0.3	2	0.2	0.5	19
			MAX	29.5	27.1	28	7.4	45.2	517
			MIN	27.8	26.1	21	6.8	43.5	445
38	69.18	108	AV9	28.5	26.8	26	6.9	44.8	500
			STD	0.4	0.4	1	0.1	0.2	6
			MAX	29.2	27.2	27	7.0	45.2	509
			MIN	28.0	26.1	25	6.8	44.5	490
47	69.26	108	AV9	29.1	27.1	28	7.0	44.5	506
			STD	0.2	0.1	0	0.1	0.2	5
			MAX	29.5	27.3	28	7.1	44.8	514
			MIN	28.8	26.9	27	6.9	44.1	498
56	69.35	96	AV9	29.2	27.1	29	7.0	44.4	502
			STD	0.3	0.3	1	0.1	0.3	5
			MAX	29.8	27.5	30	7.2	44.8	509
			MIN	28.9	26.8	27	6.9	43.8	496
66	69.46	96	AV10	29.6	27.3	30	7.2	43.9	504
			STD	0.3	0.2	1	0.1	0.2	5
			MAX	30.1	27.7	31	7.4	44.3	512
			MIN	29.2	27.1	28	7.1	43.5	494
76	69.57	87	AV10	29.5	27.0	29	7.2	44.1	492
			STD	0.2	0.3	1	0.1	0.2	7
			MAX	29.8	27.4	30	7.3	44.4	505
			MIN	29.1	26.6	28	7.0	43.6	483
85	69.69	87	AV10	30.1	27.9	31	7.4	43.5	516
			STD	0.5	0.4	1	0.1	0.4	8
			MAX	30.9	28.5	32	7.6	44.1	529
			MIN	29.3	27.1	29	7.1	42.8	498
96	69.80	87	AV10	30.3	27.8	31	7.4	43.5	509
			STD	0.3	0.2	1	0.1	0.3	6
			MAX	30.8	28.0	32	7.5	44.1	516
			MIN	29.7	27.3	29	7.1	43.1	494

USH 10 over Little Lake Butte des Morts - Pier 1 #44 Restrike
OP: MR

APE D30-42, HP 14 x 73
Test date: 20-Nov-2014

BL# end	depth ft	BLC bl/ft	TYPE	CSX ksi	CSB ksi	EMX k-ft	STK ft	BPM **	RX9 kips
106	69.93	80	AV10	30.3	27.7	31	7.3	43.5	506
			STD	0.2	0.2	1	0.1	0.2	5
			MAX	30.7	28.1	32	7.4	43.8	514
			MIN	30.0	27.4	30	7.2	43.3	500
116	70.05	80	AV10	30.5	27.9	31	7.4	43.4	512
			STD	0.2	0.3	1	0.1	0.2	6
			MAX	30.8	28.6	32	7.5	43.9	520
			MIN	30.1	27.5	30	7.2	43.1	503
126	70.18	80	AV10	30.7	28.0	32	7.4	43.4	512
			STD	0.4	0.3	1	0.1	0.4	5
			MAX	31.3	28.4	33	7.6	44.0	519
			MIN	30.0	27.4	30	7.2	42.7	505
136	70.30	80	AV10	30.6	28.1	31	7.4	43.5	515
			STD	0.3	0.2	1	0.1	0.3	4
			MAX	31.1	28.4	32	7.6	43.8	521
			MIN	30.2	27.8	30	7.2	42.9	510
146	70.43	80	AV10	30.9	28.5	32	7.5	43.2	524
			STD	0.2	0.2	1	0.1	0.2	5
			MAX	31.1	28.7	33	7.6	43.6	530
			MIN	30.4	28.2	31	7.3	42.9	514
156	70.55	80	AV10	31.0	28.6	32	7.6	42.9	526
			STD	0.4	0.3	1	0.1	0.3	6
			MAX	31.5	29.1	33	7.7	43.6	536
			MIN	30.2	27.9	31	7.3	42.5	514
166	70.68	80	AV10	31.0	28.7	33	7.6	42.9	526
			STD	0.4	0.3	1	0.1	0.4	7
			MAX	31.7	29.4	34	7.8	43.6	538
			MIN	30.3	28.2	31	7.3	42.3	515
176	70.80	80	AV10	30.7	28.5	32	7.5	43.0	530
			STD	0.4	0.4	1	0.1	0.4	6
			MAX	31.4	29.3	33	7.8	43.7	540
			MIN	30.0	27.9	30	7.3	42.3	520
186	70.92	87	AV10	31.1	29.1	33	7.7	42.6	541
			STD	0.4	0.3	1	0.1	0.4	7
			MAX	31.6	29.5	34	7.9	43.3	550
			MIN	30.5	28.5	32	7.4	42.1	530
196	71.03	87	AV10	31.0	29.2	33	7.6	42.8	546
			STD	0.4	0.3	1	0.2	0.4	6
			MAX	31.7	29.6	34	7.8	43.4	559
			MIN	30.5	28.9	31	7.4	42.2	537
206	71.14	96	AV10	30.9	29.1	32	7.5	43.0	547
			STD	0.4	0.3	1	0.1	0.3	4
			MAX	31.4	29.6	33	7.7	43.6	555
			MIN	30.2	28.6	31	7.3	42.6	540
216	71.24	96	AV10	30.7	29.1	32	7.5	43.2	551
			STD	0.4	0.4	1	0.1	0.4	4
			MAX	31.2	29.4	33	7.6	43.7	555
			MIN	30.1	28.5	31	7.3	42.8	543
226	71.34	96	AV10	30.7	29.1	32	7.5	43.2	556
			STD	0.3	0.3	1	0.1	0.3	4
			MAX	31.2	29.7	33	7.6	43.6	562
			MIN	30.3	28.9	31	7.3	42.7	551

USH 10 over Little Lake Butte des Morts - Pier 1 #44 Restrike

APE D30-42, HP 14 x 73

OP: MR

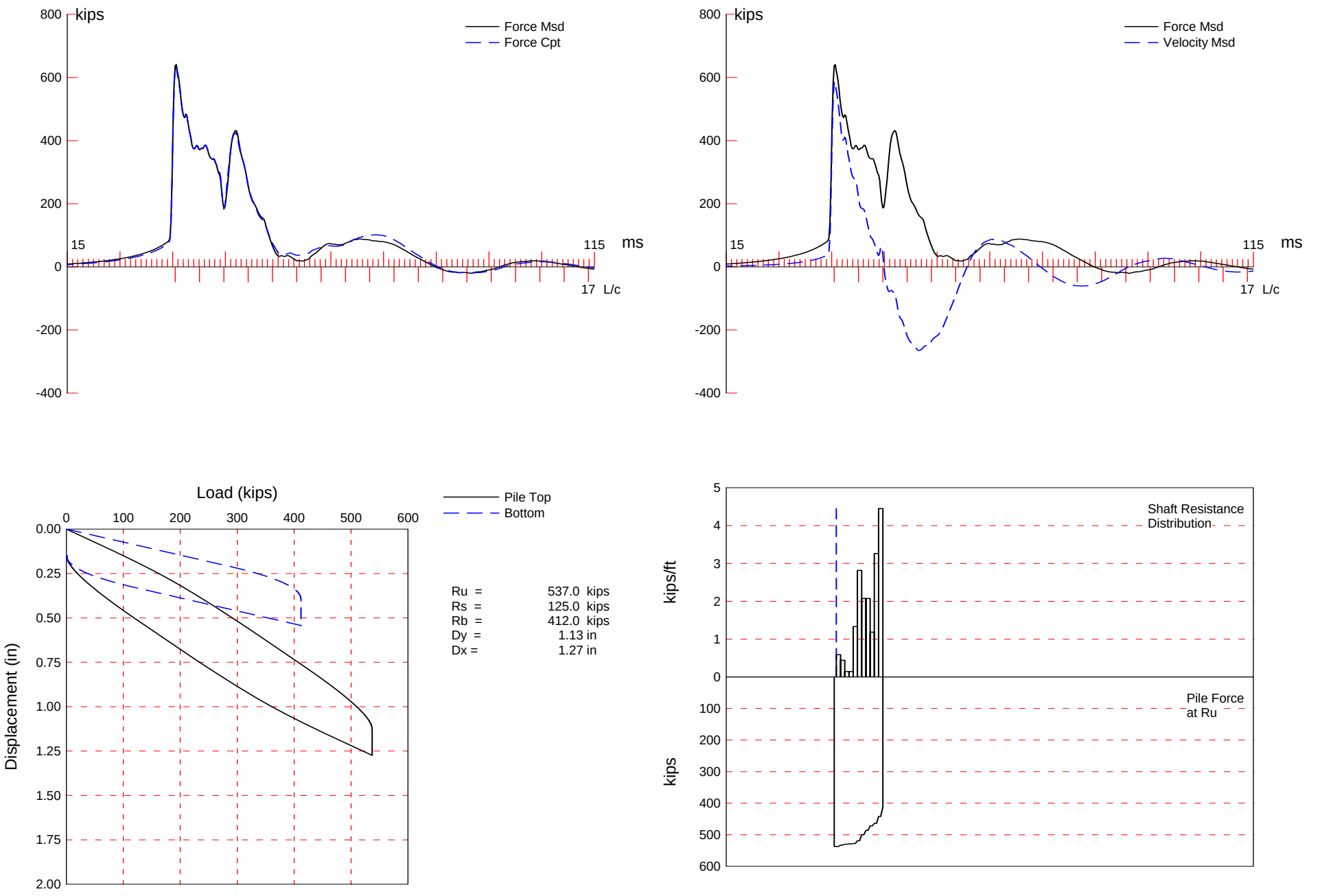
Test date: 20-Nov-2014

BL#	depth	BLC	TYPE	CSX	CSB	EMX	STK	BPM	RX9
end	ft	bl/ft		ksi	ksi	k-ft	ft	**	kips
236	71.44	107	AV10	30.7	29.5	32	7.5	43.2	565
			STD	0.4	0.4	1	0.1	0.4	8
			MAX	31.5	30.4	34	7.7	43.7	578
			MIN	30.3	29.1	31	7.3	42.5	554
Average				30.1	28.0	30	7.3	43.6	519
Std. Dev.				1.0	1.1	3	0.2	0.7	23
Maximum				31.7	30.4	34	7.9	45.2	578
Minimum				27.1	24.7	21	6.8	42.1	445
Total number of blows analyzed: 234									

BL#	depth (ft)	Comments
20	69.00	End of Restrike. Continue driving

Time Summary

Drive 7 minutes 30 seconds 7:44:20 AM - 7:51:50 AM (11/20/2014) BN 1 - 236



USH 10 over Little Lake Butte des Morts; Pile: Pier 1 #1 EOID Test: 19-Nov-2014 13:39:
 APE D30-42, HP 14 x 73; Blow: 516 CAPWAP(R) 2006-3
 GRL Engineers, Inc. OP: MR

CAPWAP SUMMARY RESULTS

Total CAPWAP Capacity: 537.0; along Shaft 125.0; at Toe 412.0 kips								
Soil Sgmnt No.	Dist. Below Gages ft	Depth Below Grade ft	Ru kips	Force in Pile kips	Sum of Ru kips	Unit Resist. (Depth) kips/ft	Unit Resist. (Area) ksf	Smith Damping Factor s/ft
				537.0				
1	10.1	6.0	4.0	533.0	4.0	0.66	0.14	0.248
2	16.8	12.8	3.0	530.0	7.0	0.45	0.09	0.248
3	23.6	19.5	1.0	529.0	8.0	0.15	0.03	0.248
4	30.3	26.3	1.0	528.0	9.0	0.15	0.03	0.248
5	37.1	33.0	9.0	519.0	18.0	1.34	0.28	0.248
6	43.8	39.7	19.0	500.0	37.0	2.82	0.60	0.248
7	50.5	46.5	14.0	486.0	51.0	2.08	0.44	0.248
8	57.3	53.2	14.0	472.0	65.0	2.08	0.44	0.248
9	64.0	60.0	8.0	464.0	73.0	1.19	0.25	0.248
10	70.8	66.7	22.0	442.0	95.0	3.26	0.69	0.248
11	77.5	73.4	30.0	412.0	125.0	4.45	0.95	0.248
Avg. Shaft			11.4			1.70	0.36	0.248
Toe			412.0				298.88	0.090

Soil Model Parameters/Extensions		Shaft	Toe
Quake	(in)	0.127	0.302
Case Damping Factor		0.812	0.969
Damping Type			Smith
Unloading Quake	(% of loading quake)	100	99
Reloading Level	(% of Ru)	100	100
Resistance Gap (included in Toe Quake)	(in)		0.017
Soil Plug Weight	(kips)		0.08

CAPWAP match quality = 2.21 (Wave Up Match) ; RSA = 0
 Observed: final set = 0.150 in; blow count = 80 b/ft
 Computed: final set = 0.111 in; blow count = 108 b/ft
 max. Top Comp. Stress = 29.7 ksi (T= 36.1 ms, max= 1.018 x Top)
 max. Comp. Stress = 30.2 ksi (Z= 37.1 ft, T= 38.1 ms)
 max. Tens. Stress = -1.47 ksi (Z= 37.1 ft, T= 58.5 ms)
 max. Energy (EMX) = 32.0 kip-ft; max. Measured Top Displ. (DMX)= 0.90 in

USH 10 over Little Lake Butte des Morts; Pile: Pier 1 #1 EOID Test: 19-Nov-2014 13:39:
 APE D30-42, HP 14 x 73; Blow: 516 CAPWAP(R) 2006-3
 GRL Engineers, Inc. OP: MR

EXTREMA TABLE

Pile Sgmnt No.	Dist. Below Gages ft	max. Force kips	min. Force kips	max. Comp. Stress ksi	max. Tens. Stress ksi	max. Trnsfd. Energy kip-ft	max. Veloc. ft/s	max. Displ. in
1	3.4	635.8	-22.0	29.7	-1.03	31.96	15.4	0.916
2	6.7	641.3	-23.5	30.0	-1.10	31.77	15.3	0.899
4	13.5	630.3	-22.7	29.4	-1.06	30.35	15.0	0.859
5	16.8	632.7	-24.5	29.6	-1.14	30.03	14.9	0.837
6	20.2	621.0	-23.0	29.0	-1.08	29.02	14.9	0.813
7	23.6	623.1	-24.7	29.1	-1.15	28.59	14.8	0.788
8	27.0	621.1	-25.1	29.0	-1.17	27.93	14.7	0.761
9	30.3	627.6	-26.6	29.3	-1.24	27.44	14.6	0.734
10	33.7	633.9	-27.1	29.6	-1.27	26.74	14.3	0.705
11	37.1	647.0	-31.4	30.2	-1.47	26.16	14.0	0.676
12	40.4	626.7	-23.0	29.3	-1.07	24.12	13.5	0.646
13	43.8	640.0	-29.7	29.9	-1.39	23.48	13.1	0.615
14	47.2	574.6	-7.4	26.8	-0.35	20.19	12.7	0.584
15	50.5	586.3	-14.1	27.4	-0.66	19.55	12.4	0.553
16	53.9	543.2	-0.1	25.4	-0.01	17.18	12.1	0.522
17	57.3	552.5	-6.2	25.8	-0.29	16.54	11.8	0.491
18	60.7	506.4	0.0	23.7	0.00	14.39	11.6	0.461
19	64.0	518.5	0.0	24.2	0.00	13.79	11.3	0.431
20	67.4	506.0	0.0	23.6	0.00	12.47	11.2	0.401
21	70.8	524.1	0.0	24.5	0.00	11.89	12.3	0.372
22	74.1	505.8	0.0	23.6	0.00	9.64	13.1	0.343
23	77.5	517.8	0.0	24.2	0.00	7.80	12.7	0.315
Absolute	37.1			30.2			(T =	38.1 ms)
	37.1				-1.47		(T =	58.5 ms)

CASE METHOD

J =	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
RP	712.5	658.2	604.0	549.8	495.5	441.3	387.1	332.8	278.6	224.4
RX	726.7	689.6	670.0	650.4	630.7	611.6	592.8	575.1	558.2	543.6
RU	712.5	658.2	604.0	549.8	495.5	441.3	387.1	332.8	278.6	224.4
RAU =	384.0 (kips);			RA2 = 592.4 (kips)						

Current CAPWAP Ru = 537.0 (kips); Corresponding J(RP)= 0.32; matches RX9 within 5%

VMX ft/s	TVP ms	VT1*Z kips	FT1 kips	FMX kips	DMX in	DFN in	SET in	EMX kip-ft	QUS kips
15.71	35.68	599.9	654.9	654.9	0.900	0.152	0.150	32.2	736.6

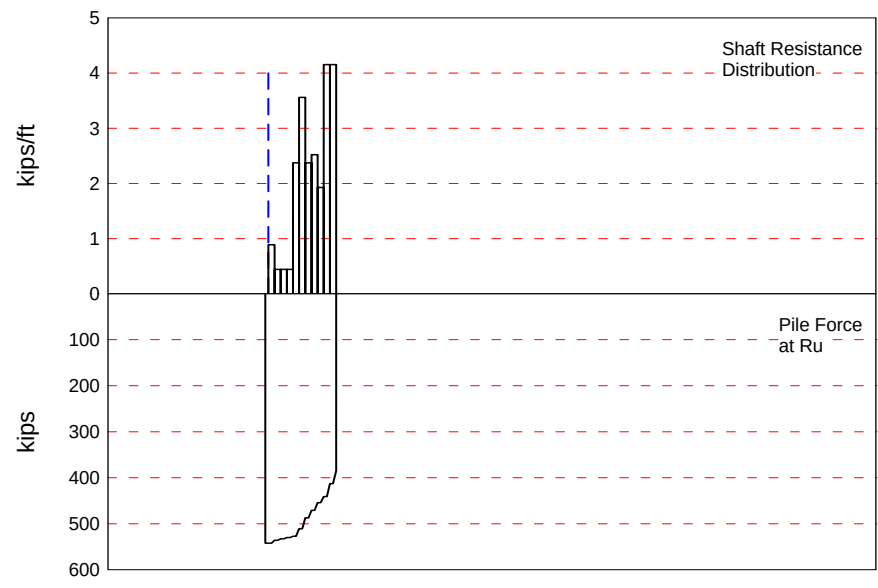
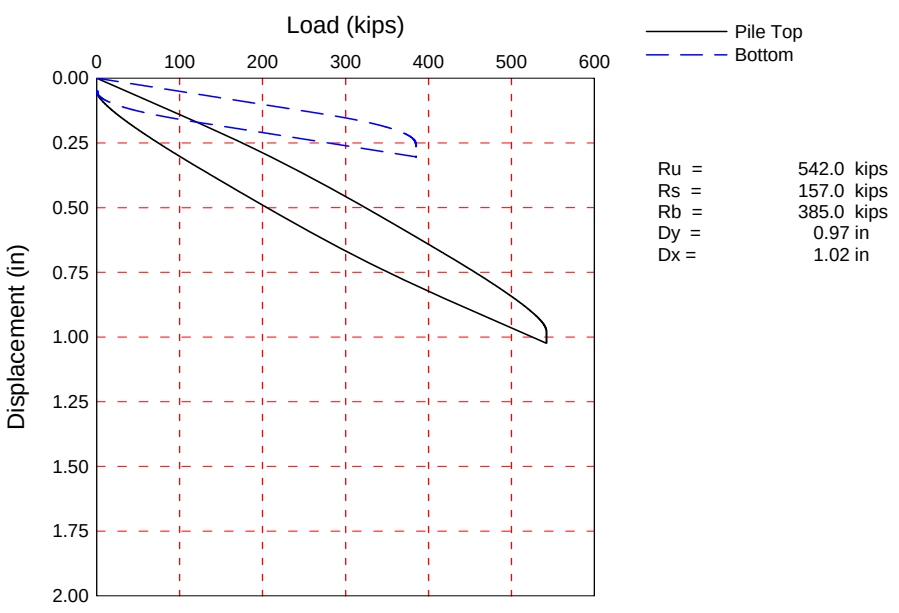
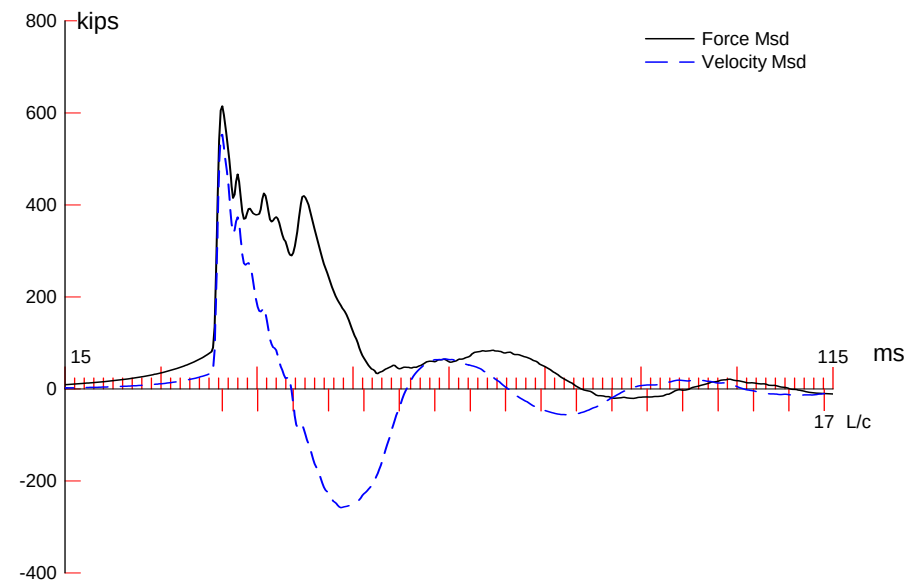
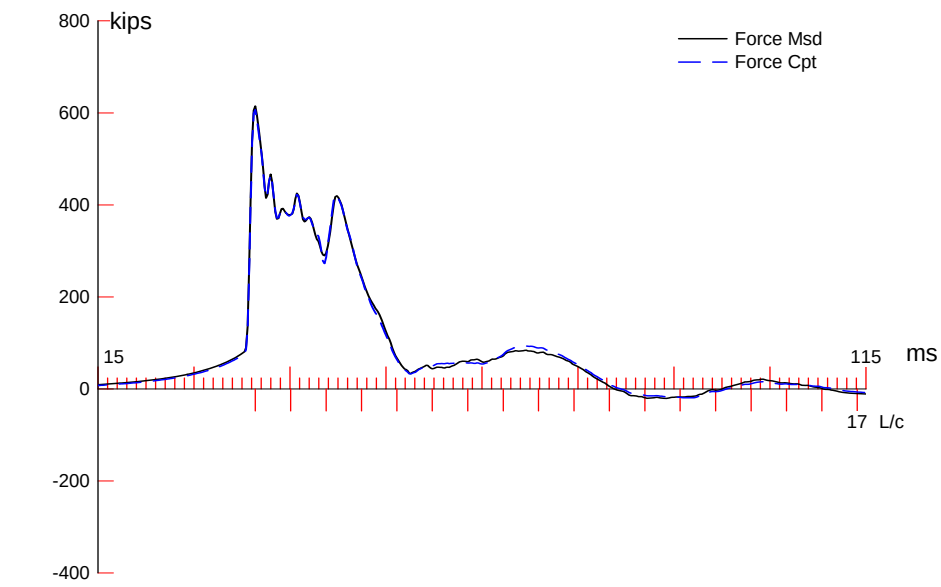
PILE PROFILE AND PILE MODEL

Depth ft	Area in ²	E-Modulus ksi	Spec. Weight lb/ft ³	Perim. ft
0.00	21.40	29992.2	492.000	4.699
77.50	21.40	29992.2	492.000	4.699

Toe Area 1.378 ft²

Top Segment Length 3.37 ft, Top Impedance 38.20 kips/ft/s

Pile Damping 1.0 %, Time Incr 0.200 ms, Wave Speed 16807.9 ft/s, 2L/c 9.2 ms



USH 10 over Little Lake Butte des Morts; Pile: Pier 1 #1 BOR Test: 20-Nov-2014 08:07:
 APE D30-42, HP 14 x 73; Blow: 4 CAPWAP(R) 2006-3
 GRL Engineers, Inc. OP: MR

CAPWAP SUMMARY RESULTS

Total CAPWAP Capacity: 542.0; along Shaft 157.0; at Toe 385.0 kips

Soil Sgmt No.	Dist. Below Gages ft	Depth Below Grade ft	Ru kips	Force in Pile kips	Sum of Ru kips	Unit Resist. (Depth) kips/ft	Unit Resist. (Area) ksf	Smith Damping Factor s/ft
				542.0				
1	10.1	6.1	6.0	536.0	6.0	0.99	0.21	0.247
2	16.8	12.8	3.0	533.0	9.0	0.45	0.09	0.247
3	23.6	19.6	3.0	530.0	12.0	0.45	0.09	0.247
4	30.3	26.3	3.0	527.0	15.0	0.45	0.09	0.247
5	37.1	33.0	16.0	511.0	31.0	2.37	0.51	0.247
6	43.8	39.8	24.0	487.0	55.0	3.56	0.76	0.247
7	50.5	46.5	16.0	471.0	71.0	2.37	0.51	0.247
8	57.3	53.3	17.0	454.0	88.0	2.52	0.54	0.247
9	64.0	60.0	13.0	441.0	101.0	1.93	0.41	0.247
10	70.8	66.7	28.0	413.0	129.0	4.15	0.88	0.247
11	77.5	73.5	28.0	385.0	157.0	4.15	0.88	0.247
Avg. Shaft			14.3			2.14	0.45	0.247
Toe			385.0				279.29	0.119

Soil Model Parameters/Extensions			Shaft	Toe
Quake	(in)		0.160	0.195
Case Damping Factor			1.015	1.201
Damping Type				Smith
Reloading Level	(% of Ru)		100	100
Unloading Level	(% of Ru)		75	
Soil Plug Weight	(kips)			0.07

CAPWAP match quality = 1.52 (Wave Up Match) ; RSA = 0
 Observed: final set = 0.050 in; blow count = 240 b/ft
 Computed: final set = 0.055 in; blow count = 220 b/ft
 max. Top Comp. Stress = 28.5 ksi (T= 35.9 ms, max= 1.019 x Top)
 max. Comp. Stress = 29.1 ksi (Z= 10.1 ft, T= 36.3 ms)
 max. Tens. Stress = -1.63 ksi (Z= 37.1 ft, T= 58.1 ms)
 max. Energy (EMX) = 27.8 kip-ft; max. Measured Top Displ. (DMX)= 0.81 in

USH 10 over Little Lake Butte des Morts; Pile: Pier 1 #1 BOR Test: 20-Nov-2014 08:07:
 APE D30-42, HP 14 x 73; Blow: 4 CAPWAP(R) 2006-3
 GRL Engineers, Inc. OP: MR

EXTREMA TABLE

Pile Sgmnt No.	Dist. Below Gages ft	max. Force kips	min. Force kips	max. Comp. Stress ksi	max. Tens. Stress ksi	max. Trnsfd. Energy kip-ft	max. Veloc. ft/s	max. Displ. in
1	3.4	610.8	-19.8	28.5	-0.93	27.83	14.6	0.814
2	6.7	617.8	-20.1	28.9	-0.94	27.56	14.4	0.793
4	13.5	599.7	-18.4	28.0	-0.86	25.84	14.2	0.749
5	16.8	603.5	-20.3	28.2	-0.95	25.45	14.0	0.725
6	20.2	594.4	-19.5	27.8	-0.91	24.50	13.9	0.699
7	23.6	598.3	-21.1	28.0	-0.99	23.99	13.8	0.671
8	27.0	589.7	-20.2	27.5	-0.94	23.02	13.7	0.643
9	30.3	599.1	-25.2	28.0	-1.18	22.48	13.4	0.615
10	33.7	602.4	-28.1	28.1	-1.31	21.50	13.0	0.585
11	37.1	618.8	-34.9	28.9	-1.63	20.86	12.6	0.554
12	40.4	577.4	-20.7	27.0	-0.97	18.39	12.0	0.523
13	43.8	592.3	-27.2	27.7	-1.27	17.72	11.6	0.491
14	47.2	520.3	-4.7	24.3	-0.22	14.76	11.3	0.460
15	50.5	532.3	-10.8	24.9	-0.51	14.14	10.9	0.430
16	53.9	492.2	0.0	23.0	0.00	12.20	10.6	0.400
17	57.3	502.7	-4.8	23.5	-0.22	11.60	10.3	0.369
18	60.7	472.4	0.0	22.1	0.00	9.86	10.0	0.340
19	64.0	472.8	0.0	22.1	0.00	9.31	9.7	0.312
20	67.4	477.8	0.0	22.3	0.00	8.07	9.2	0.284
21	70.8	488.8	0.0	22.8	0.00	7.55	9.6	0.256
22	74.1	463.6	0.0	21.7	0.00	5.88	10.4	0.229
23	77.5	469.9	0.0	22.0	0.00	4.95	9.8	0.203
Absolute	10.1			29.1			(T =	36.3 ms)
	37.1				-1.63		(T =	58.1 ms)

CASE METHOD

J =	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
RP	751.7	707.8	664.0	620.1	576.2	532.3	488.4	444.5	400.7	356.8
RX	760.3	717.6	680.8	648.5	619.7	603.1	586.4	569.7	553.0	536.3
RU	752.3	708.4	664.6	620.8	576.9	533.1	489.3	445.4	401.6	357.8

RAU = 359.9 (kips); RA2 = 597.5 (kips)

Current CAPWAP Ru = 542.0 (kips); Corresponding J(RP)= 0.48; J(RX) = 0.87

VMX ft/s	TVP ms	VT1*Z kips	FT1 kips	FMX kips	DMX in	DFN in	SET in	EMX kip-ft	QUS kips
14.80	35.68	565.4	625.2	625.2	0.809	0.052	0.050	28.2	788.0

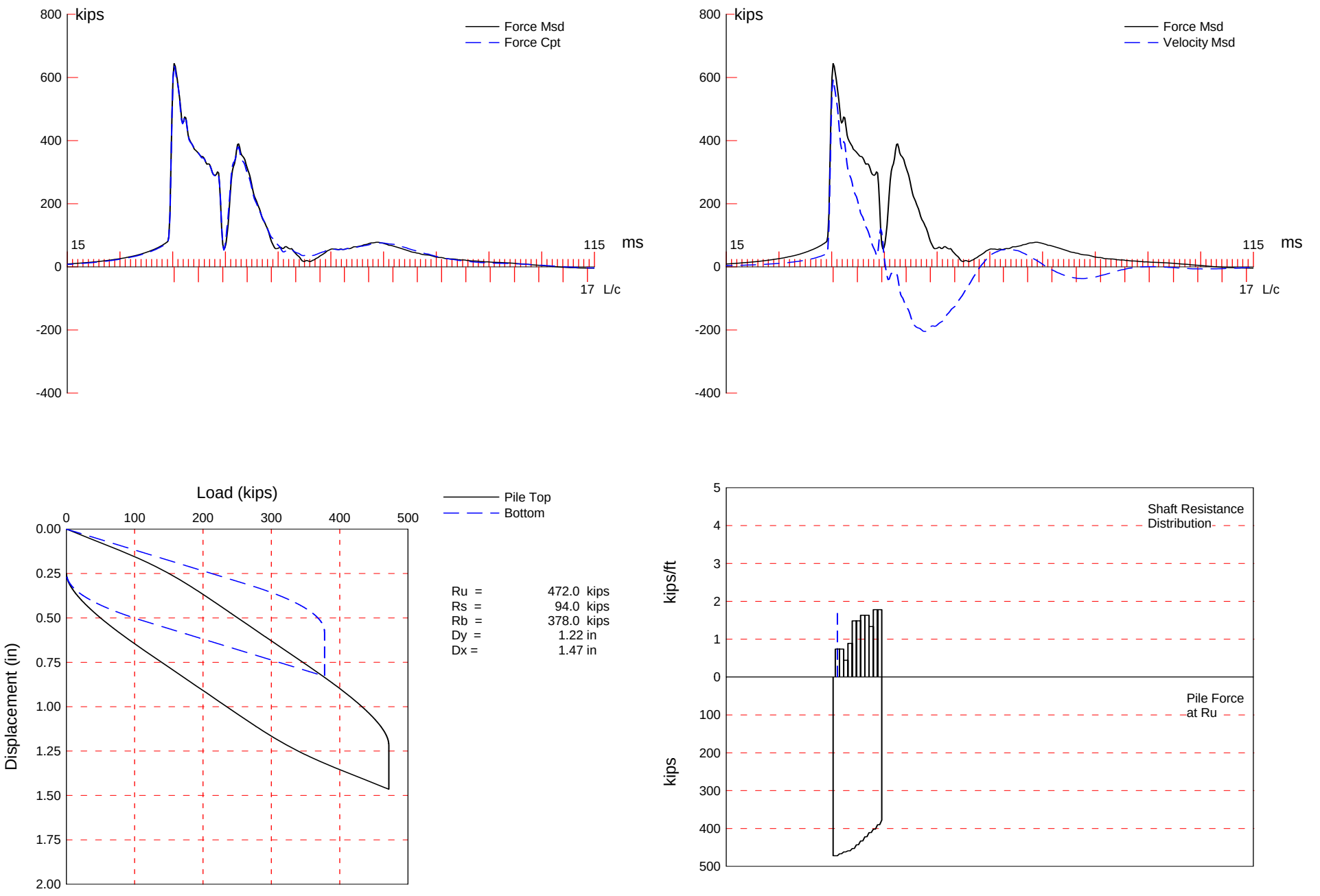
PILE PROFILE AND PILE MODEL

Depth ft	Area in ²	E-Modulus ksi	Spec. Weight lb/ft ³	Perim. ft
0.00	21.40	29992.2	492.000	4.699
77.50	21.40	29992.2	492.000	4.699

Toe Area 1.378 ft²

Top Segment Length 3.37 ft, Top Impedance 38.20 kips/ft/s

Pile Damping 1.0 %, Time Incr 0.200 ms, Wave Speed 16807.9 ft/s, 2L/c 9.2 ms



USH 10 over Little Lake Butte des Morts; Pile: Pier 1 #36 EOID Test: 19-Nov-2014 12:58:
 APE D30-42, HP 14 x 73; Blow: 569 CAPWAP(R) 2006-3
 GRL Engineers, Inc. OP: MR

CAPWAP SUMMARY RESULTS

Total CAPWAP Capacity: 472.0; along Shaft 94.0; at Toe 378.0 kips								
Soil Sgmnt No.	Dist. Below Gages ft	Depth Below Grade ft	Ru kips	Force in Pile kips	Sum of Ru kips	Unit Resist. (Depth) kips/ft	Unit Resist. (Area) ksf	Smith Damping Factor s/ft
				472.0				
1	10.1	2.9	5.0	467.0	5.0	1.70	0.36	0.269
2	16.8	9.7	5.0	462.0	10.0	0.74	0.16	0.269
3	23.6	16.4	3.0	459.0	13.0	0.45	0.09	0.269
4	30.3	23.2	6.0	453.0	19.0	0.89	0.19	0.269
5	37.1	29.9	10.0	443.0	29.0	1.48	0.32	0.269
6	43.8	36.6	10.0	433.0	39.0	1.48	0.32	0.269
7	50.5	43.4	11.0	422.0	50.0	1.63	0.35	0.269
8	57.3	50.1	11.0	411.0	61.0	1.63	0.35	0.269
9	64.0	56.9	9.0	402.0	70.0	1.34	0.28	0.269
10	70.8	63.6	12.0	390.0	82.0	1.78	0.38	0.269
11	77.5	70.3	12.0	378.0	94.0	1.78	0.38	0.269
Avg. Shaft			8.5			1.34	0.28	0.269
Toe			378.0				274.21	0.073

Soil Model Parameters/Extensions		Shaft	Toe
Quake	(in)	0.119	0.445
Case Damping Factor		0.662	0.722
Damping Type			Smith
Unloading Quake	(% of loading quake)	100	76
Reloading Level	(% of Ru)	100	100
Resistance Gap (included in Toe Quake) (in)			0.048
Soil Plug Weight	(kips)		0.11

CAPWAP match quality = 1.77 (Wave Up Match) ; RSA = 0
 Observed: final set = 0.250 in; blow count = 48 b/ft
 Computed: final set = 0.229 in; blow count = 52 b/ft
 max. Top Comp. Stress = 29.9 ksi (T= 35.7 ms, max= 1.017 x Top)
 max. Comp. Stress = 30.4 ksi (Z= 10.1 ft, T= 36.1 ms)
 max. Tens. Stress = -0.48 ksi (Z= 10.1 ft, T= 191.7 ms)
 max. Energy (EMX) = 30.7 kip-ft; max. Measured Top Displ. (DMX)= 0.91 in

USH 10 over Little Lake Butte des Morts; Pile: Pier 1 #36 EOID Test: 19-Nov-2014 12:58:
 APE D30-42, HP 14 x 73; Blow: 569 CAPWAP(R) 2006-3
 GRL Engineers, Inc. OP: MR

EXTREMA TABLE

Pile Sgmnt No.	Dist. Below Gages ft	max. Force kips	min. Force kips	max. Comp. Stress ksi	max. Tens. Stress ksi	max. Trnsfd. Energy kip-ft	max. Veloc. ft/s	max. Displ. in
1	3.4	639.7	-10.2	29.9	-0.47	30.70	15.6	0.921
2	6.7	646.1	-10.2	30.2	-0.48	30.64	15.5	0.912
4	13.5	631.2	-5.3	29.5	-0.25	29.21	15.1	0.884
5	16.8	635.2	-5.3	29.7	-0.25	28.98	15.0	0.865
6	20.2	614.0	-0.4	28.7	-0.02	27.61	14.9	0.845
7	23.6	617.6	-0.4	28.9	-0.02	27.33	14.8	0.825
8	27.0	609.7	0.0	28.5	0.00	26.42	14.6	0.804
9	30.3	615.9	0.0	28.8	0.00	26.12	14.4	0.783
10	33.7	597.5	0.0	27.9	0.00	24.62	14.1	0.761
11	37.1	605.9	0.0	28.3	0.00	24.28	13.8	0.738
12	40.4	570.5	0.0	26.7	0.00	22.12	13.5	0.716
13	43.8	580.3	0.0	27.1	0.00	21.74	13.2	0.692
14	47.2	548.3	0.0	25.6	0.00	19.67	12.9	0.668
15	50.5	557.8	0.0	26.1	0.00	19.27	12.6	0.643
16	53.9	522.2	0.0	24.4	0.00	17.16	12.3	0.619
17	57.3	530.2	0.0	24.8	0.00	16.75	12.0	0.594
18	60.7	493.8	0.0	23.1	0.00	14.76	11.9	0.570
19	64.0	506.1	0.0	23.6	0.00	14.35	11.7	0.545
20	67.4	492.9	0.0	23.0	0.00	12.74	13.1	0.520
21	70.8	487.4	0.0	22.8	0.00	12.33	14.3	0.495
22	74.1	423.6	0.0	19.8	0.00	10.45	15.2	0.471
23	77.5	441.7	-0.0	20.6	-0.00	9.25	15.5	0.446
Absolute	10.1			30.4			(T = 36.1 ms)	
	10.1				-0.48		(T = 191.7 ms)	

CASE METHOD

J =	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
RP	604.0	538.9	473.8	408.7	343.6	278.5	213.5	148.4	83.3	18.2
RX	617.0	589.8	562.6	535.4	509.1	498.1	487.5	476.8	466.1	455.4
RU	604.0	538.9	473.8	408.7	343.6	278.5	213.5	148.4	83.3	18.2
RAU =	346.7 (kips);		RA2 = 551.6 (kips)							

Current CAPWAP Ru = 472.0 (kips); Corresponding J(RP)= 0.20; J(RX) = 0.74

VMX ft/s	TVP ms	VT1*Z kips	FT1 kips	FMX kips	DMX in	DFN in	SET in	EMX kip-ft	QUS kips
15.80	35.48	603.5	651.3	654.4	0.908	0.252	0.250	30.8	638.7

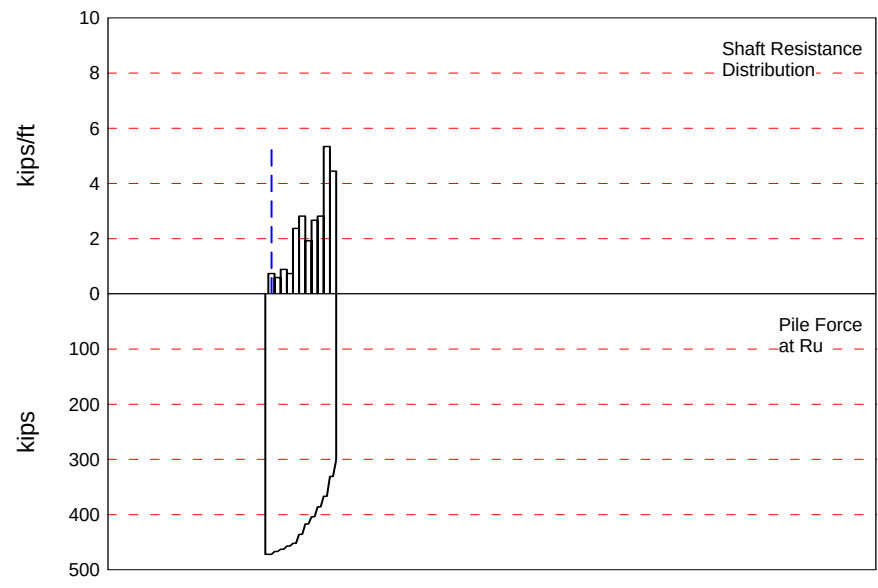
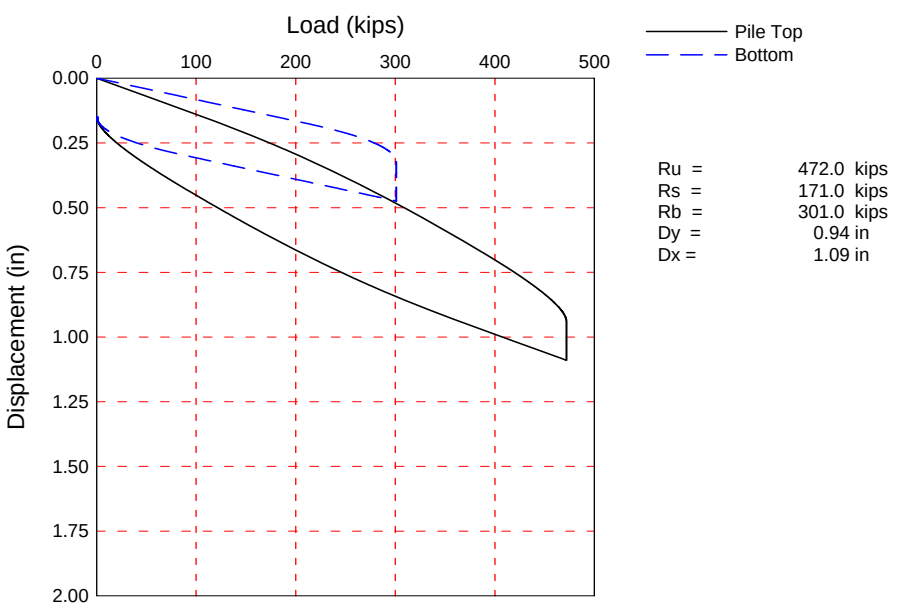
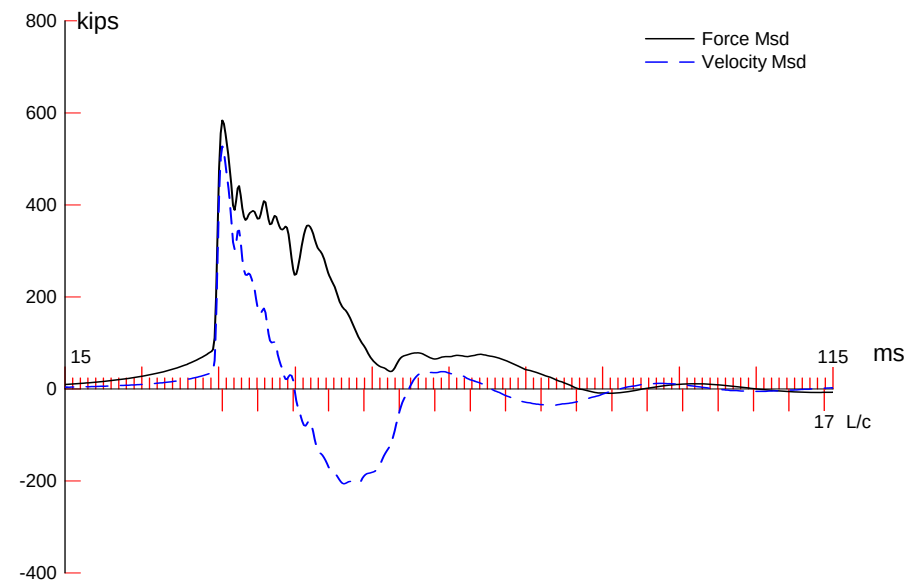
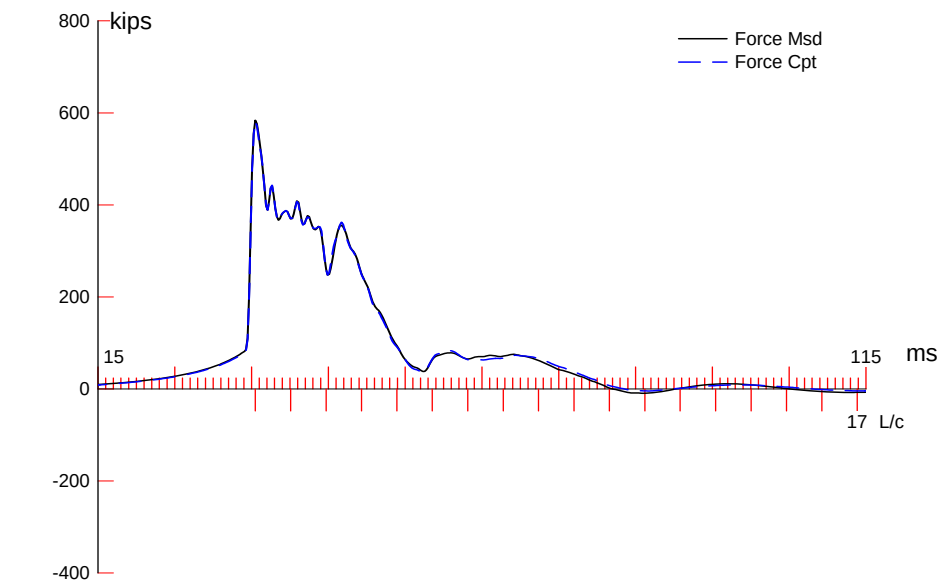
PILE PROFILE AND PILE MODEL

Depth ft	Area in ²	E-Modulus ksi	Spec. Weight lb/ft ³	Perim. ft
0.00	21.40	29992.2	492.000	4.699
77.50	21.40	29992.2	492.000	4.699
Toe Area	1.378	ft ²		

USH 10 over Little Lake Butte des Morts; Pile: Pier 1 #36 EOID Test: 19-Nov-2014 12:58:
 APE D30-42, HP 14 x 73; Blow: 569 CAPWAP(R) 2006-3
 GRL Engineers, Inc. OP: MR

Segmnt Number	Dist. B.G. ft	Impedance kips/ft/s	Imped. Change %	Slack in	Tension Eff.	Compression Slack in	Eff.	Perim. ft	Soil Plug kips
1	3.37	38.20	0.00	0.000	0.000	-0.000	0.000	4.699	0.00
22	74.13	38.20	0.00	0.000	0.000	-0.000	0.000	4.699	0.04
23	77.50	38.20	0.00	0.000	0.000	-0.000	0.000	4.699	0.00

Pile Damping 1.0 %, Time Incr 0.200 ms, Wave Speed 16807.9 ft/s, 2L/c 9.2 ms



USH 10 over Little Lake Butte des Morts; Pile: Pier 1 #36 BOR Test: 20-Nov-2014 07:33:
 APE D30-42, HP 14 x 73; Blow: 2 CAPWAP(R) 2006-3
 GRL Engineers, Inc. OP: MR

CAPWAP SUMMARY RESULTS

Total CAPWAP Capacity: 472.0; along Shaft 171.0; at Toe 301.0 kips								
Soil Sgmnt No.	Dist. Below Gages ft	Depth Below Grade ft	Ru kips	Force in Pile kips	Sum of Ru kips	Unit Resist. (Depth) kips/ft	Unit Resist. (Area) ksf	Smith Damping Factor s/ft
				472.0				
1	10.1	3.0	5.0	467.0	5.0	1.69	0.36	0.255
2	16.8	9.7	4.0	463.0	9.0	0.59	0.13	0.255
3	23.6	16.4	6.0	457.0	15.0	0.89	0.19	0.255
4	30.3	23.2	5.0	452.0	20.0	0.74	0.16	0.255
5	37.1	29.9	16.0	436.0	36.0	2.37	0.51	0.255
6	43.8	36.7	19.0	417.0	55.0	2.82	0.60	0.255
7	50.5	43.4	13.0	404.0	68.0	1.93	0.41	0.255
8	57.3	50.1	18.0	386.0	86.0	2.67	0.57	0.255
9	64.0	56.9	19.0	367.0	105.0	2.82	0.60	0.255
10	70.8	63.6	36.0	331.0	141.0	5.34	1.14	0.255
11	77.5	70.4	30.0	301.0	171.0	4.45	0.95	0.255
Avg. Shaft			15.5			2.43	0.52	0.255
Toe			301.0				218.36	0.111

Soil Model Parameters/Extensions		Shaft	Toe
Quake	(in)	0.142	0.249
Case Damping Factor		1.142	0.874
Damping Type			Smith
Unloading Quake	(% of loading quake)	100	100
Reloading Level	(% of Ru)	100	100
Unloading Level	(% of Ru)	84	
Resistance Gap (included in Toe Quake) (in)			0.002
Soil Plug Weight	(kips)		0.19

CAPWAP match quality = 1.17 (Wave Up Match) ; RSA = 0
 Observed: final set = 0.150 in; blow count = 80 b/ft
 Computed: final set = 0.117 in; blow count = 103 b/ft
 max. Top Comp. Stress = 27.2 ksi (T= 35.9 ms, max= 1.018 x Top)
 max. Comp. Stress = 27.7 ksi (Z= 10.1 ft, T= 36.3 ms)
 max. Tens. Stress = -0.57 ksi (Z= 10.1 ft, T= 170.6 ms)
 max. Energy (EMX) = 25.7 kip-ft; max. Measured Top Displ. (DMX)= 0.79 in

USH 10 over Little Lake Butte des Morts; Pile: Pier 1 #36 BOR Test: 20-Nov-2014 07:33:
 APE D30-42, HP 14 x 73; Blow: 2 CAPWAP(R) 2006-3
 GRL Engineers, Inc. OP: MR

EXTREMA TABLE

Pile Sgmnt No.	Dist. Below Gages ft	max. Force kips	min. Force kips	max. Comp. Stress ksi	max. Tens. Stress ksi	max. Trnsfd. Energy kip-ft	max. Veloc. ft/s	max. Displ. in
1	3.4	583.1	-12.1	27.2	-0.57	25.65	13.8	0.785
2	6.7	589.0	-12.1	27.5	-0.57	25.42	13.7	0.766
4	13.5	576.3	-8.0	26.9	-0.37	23.95	13.4	0.722
5	16.8	581.2	-8.0	27.2	-0.37	23.59	13.2	0.699
6	20.2	570.4	-4.7	26.6	-0.22	22.60	13.1	0.675
7	23.6	576.1	-4.7	26.9	-0.22	22.21	12.9	0.651
8	27.0	556.2	0.0	26.0	0.00	20.96	12.7	0.626
9	30.3	566.3	0.0	26.5	0.00	20.52	12.5	0.600
10	33.7	560.0	0.0	26.2	0.00	19.42	12.1	0.573
11	37.1	575.8	0.0	26.9	0.00	18.93	11.7	0.546
12	40.4	529.1	0.0	24.7	0.00	16.75	11.3	0.521
13	43.8	541.7	0.0	25.3	0.00	16.30	10.9	0.495
14	47.2	483.7	0.0	22.6	0.00	14.06	10.6	0.469
15	50.5	496.7	0.0	23.2	0.00	13.62	10.4	0.443
16	53.9	465.2	0.0	21.7	0.00	12.14	10.0	0.418
17	57.3	478.9	0.0	22.4	0.00	11.72	9.7	0.393
18	60.7	435.4	0.0	20.3	0.00	10.08	9.3	0.369
19	64.0	454.8	0.0	21.2	0.00	9.71	8.9	0.345
20	67.4	420.2	0.0	19.6	0.00	8.25	8.3	0.322
21	70.8	430.1	0.0	20.1	0.00	7.88	8.4	0.299
22	74.1	366.8	0.0	17.1	0.00	5.88	9.4	0.277
23	77.5	370.9	0.0	17.3	0.00	4.62	9.7	0.257
Absolute	10.1			27.7			(T = 36.3 ms)	
	10.1				-0.57		(T = 170.6 ms)	

CASE METHOD

J =	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
RP	680.4	636.0	591.6	547.2	502.8	458.4	414.0	369.6	325.2	280.8
RX	681.3	637.3	594.4	555.1	536.1	517.1	498.1	479.1	460.2	449.3
RU	680.4	636.0	591.6	547.2	502.8	458.4	414.0	369.6	325.2	280.8

RAU = 274.6 (kips); RA2 = 545.1 (kips)

Current CAPWAP Ru = 472.0 (kips); Corresponding J(RP)= 0.47; J(RX) = 0.74

VMX ft/s	TVP ms	VT1*Z kips	FT1 kips	FMX kips	DMX in	DFN in	SET in	EMX kip-ft	QUS kips
13.98	35.68	533.8	590.5	590.5	0.789	0.149	0.150	26.0	663.7

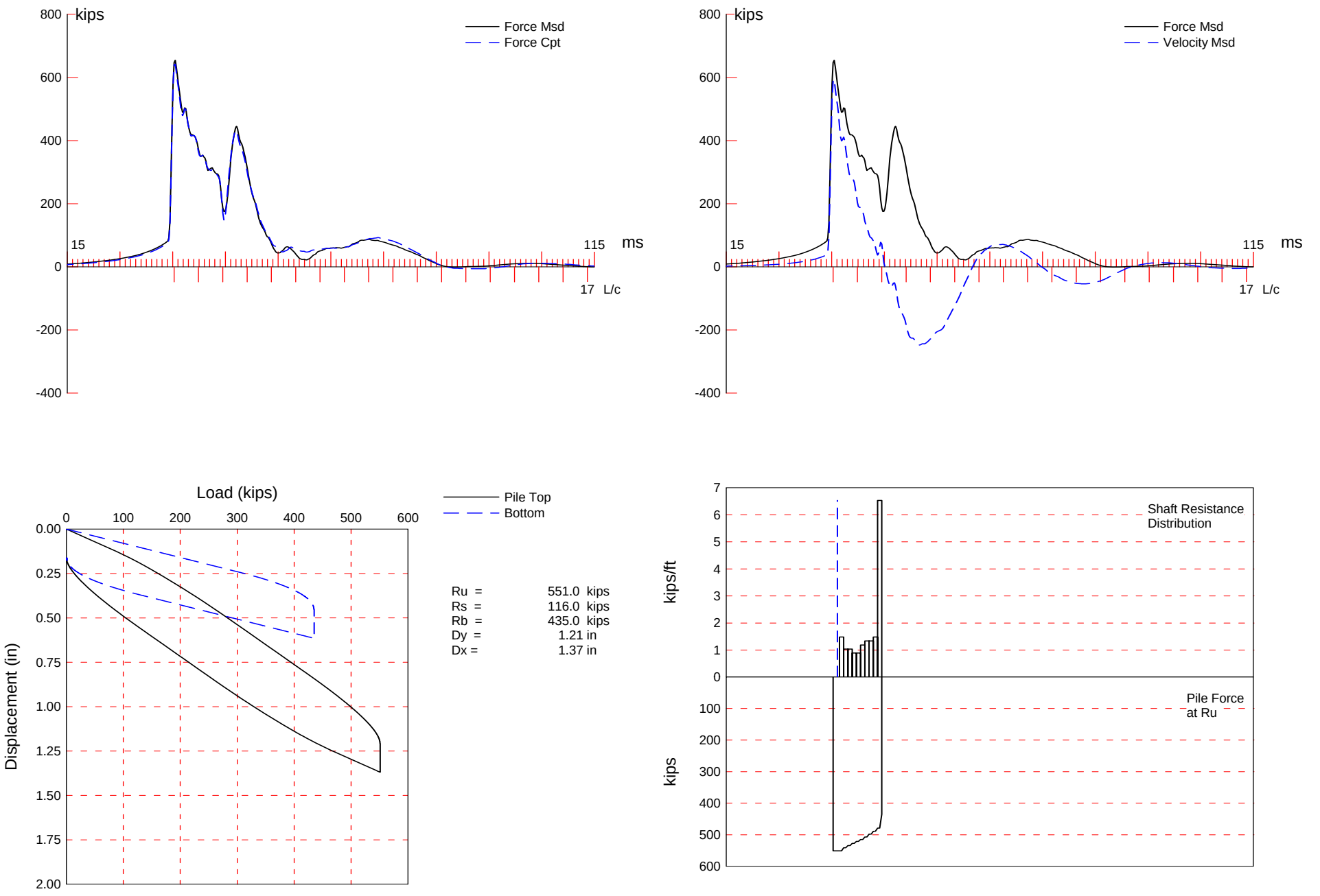
PILE PROFILE AND PILE MODEL

Depth ft	Area in ²	E-Modulus ksi	Spec. Weight lb/ft ³	Perim. ft
0.00	21.40	29992.2	492.000	4.699
77.50	21.40	29992.2	492.000	4.699

Toe Area 1.378 ft²

Top Segment Length 3.37 ft, Top Impedance 38.20 kips/ft/s

Pile Damping 1.0 %, Time Incr 0.200 ms, Wave Speed 16807.9 ft/s, 2L/c 9.2 ms



USH 10 over Little Lake Butte des Morts; Pile: Pier 1 #44 EOID Test: 19-Nov-2014 12:11:
 APE D30-42, HP 14 x 73; Blow: 523 CAPWAP(R) 2006-3
 GRL Engineers, Inc. OP: MR

CAPWAP SUMMARY RESULTS

Total CAPWAP Capacity:			551.0; along Shaft	116.0; at Toe		435.0 kips		
Soil Sgmnt No.	Dist. Below Gages ft	Depth Below Grade ft	Ru kips	Force in Pile kips	Sum of Ru kips	Unit Resist. (Depth) kips/ft	Unit Resist. (Area) ksf	Smith Damping Factor s/ft
				551.0				
1	16.8	8.2	10.0	541.0	10.0	1.23	0.26	0.245
2	23.6	14.9	7.0	534.0	17.0	1.04	0.22	0.245
3	30.3	21.6	7.0	527.0	24.0	1.04	0.22	0.245
4	37.1	28.4	6.0	521.0	30.0	0.89	0.19	0.245
5	43.8	35.1	6.0	515.0	36.0	0.89	0.19	0.245
6	50.5	41.8	8.0	507.0	44.0	1.19	0.25	0.245
7	57.3	48.6	9.0	498.0	53.0	1.34	0.28	0.245
8	64.0	55.3	9.0	489.0	62.0	1.34	0.28	0.245
9	70.8	62.1	10.0	479.0	72.0	1.48	0.32	0.245
10	77.5	68.8	44.0	435.0	116.0	6.53	1.39	0.245
Avg. Shaft			11.6			1.69	0.36	0.245
Toe			435.0				315.56	0.058
Soil Model Parameters/Extensions					Shaft	Toe		
Quake		(in)			0.110	0.348		
Case Damping Factor					0.744	0.661		
Damping Type						Smith		
Reloading Level		(% of Ru)			100	100		
Resistance Gap (included in Toe Quake)		(in)				0.024		
Soil Plug Weight		(kips)				0.17		
CAPWAP match quality			=	2.27	(Wave Up Match) ; RSA = 0			
Observed: final set			=	0.163 in;	blow count	=	74 b/ft	
Computed: final set			=	0.123 in;	blow count	=	97 b/ft	
max. Top Comp. Stress			=	30.1 ksi	(T= 35.9 ms, max= 1.043 x Top)			
max. Comp. Stress			=	31.3 ksi	(Z= 16.8 ft, T= 36.7 ms)			
max. Tens. Stress			=	-0.69 ksi	(Z= 16.8 ft, T= 89.6 ms)			
max. Energy (EMX)			=	32.4 kip-ft; max. Measured Top Displ. (DMX)= 0.90 in				

USH 10 over Little Lake Butte des Morts; Pile: Pier 1 #44 EOID Test: 19-Nov-2014 12:11:
 APE D30-42, HP 14 x 73; Blow: 523 CAPWAP(R) 2006-3
 GRL Engineers, Inc. OP: MR

EXTREMA TABLE

Pile Sgmnt No.	Dist. Below Gages ft	max. Force kips	min. Force kips	max. Comp. Stress ksi	max. Tens. Stress ksi	max. Trnsfd. Energy kip-ft	max. Veloc. ft/s	max. Displ. in
1	3.4	643.3	-8.4	30.1	-0.39	32.36	15.8	0.926
2	6.7	644.7	-9.2	30.1	-0.43	32.21	15.7	0.911
4	13.5	663.3	-13.0	31.0	-0.61	31.74	15.3	0.874
5	16.8	671.0	-14.8	31.3	-0.69	31.46	15.0	0.853
6	20.2	633.4	-6.2	29.6	-0.29	29.08	14.8	0.832
7	23.6	640.1	-7.9	29.9	-0.37	28.74	14.6	0.809
8	27.0	616.7	-2.5	28.8	-0.12	27.02	14.4	0.786
9	30.3	622.7	-3.9	29.1	-0.18	26.64	14.2	0.762
10	33.7	598.7	0.0	28.0	0.00	24.97	14.0	0.738
11	37.1	604.3	0.0	28.2	0.00	24.57	13.9	0.713
12	40.4	585.1	0.0	27.3	0.00	23.10	13.7	0.687
13	43.8	591.7	-0.4	27.6	-0.02	22.60	13.5	0.660
14	47.2	574.6	0.0	26.8	0.00	21.11	13.3	0.631
15	50.5	582.3	-0.9	27.2	-0.04	20.55	13.1	0.602
16	53.9	558.1	0.0	26.1	0.00	18.85	12.8	0.573
17	57.3	566.8	0.0	26.5	0.00	18.29	12.6	0.544
18	60.7	542.9	0.0	25.4	0.00	16.58	12.3	0.515
19	64.0	551.2	0.0	25.8	0.00	15.98	12.0	0.485
20	67.4	529.0	0.0	24.7	0.00	14.36	11.7	0.455
21	70.8	531.6	-0.0	24.8	-0.00	13.71	12.6	0.423
22	74.1	533.9	-0.0	24.9	-0.00	12.14	13.7	0.393
23	77.5	552.3	-0.0	25.8	-0.00	8.63	13.8	0.364
Absolute	16.8			31.3			(T =	36.7 ms)
	16.8				-0.69		(T =	89.6 ms)

CASE METHOD

J =	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
RP	700.0	641.9	583.7	525.6	467.4	409.3	351.1	293.0	234.8	176.7
RX	702.6	675.3	652.2	629.2	607.2	586.2	569.6	557.6	548.6	540.3
RU	700.0	641.9	583.7	525.6	467.4	409.3	351.1	293.0	234.8	176.7

RAU = 337.5 (kips); RA2 = 635.2 (kips)

Current CAPWAP Ru = 551.0 (kips); Corresponding J(RP)= 0.26; J(RX) = 0.77

VMX ft/s	TVP ms	VT1*Z kips	FT1 kips	FMX kips	DMX in	DFN in	SET in	EMX kip-ft	QUS kips
16.01	35.48	611.3	670.1	670.1	0.897	0.160	0.163	32.5	735.0

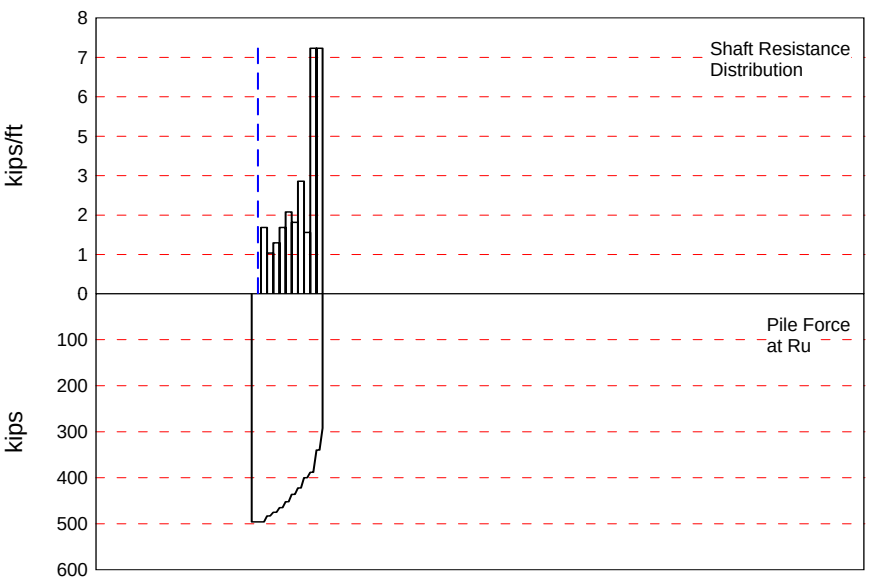
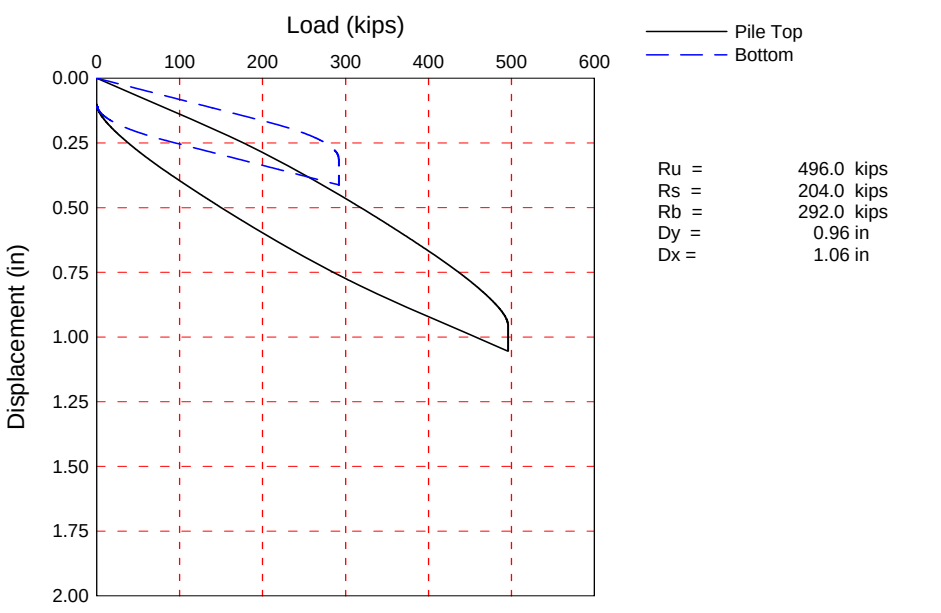
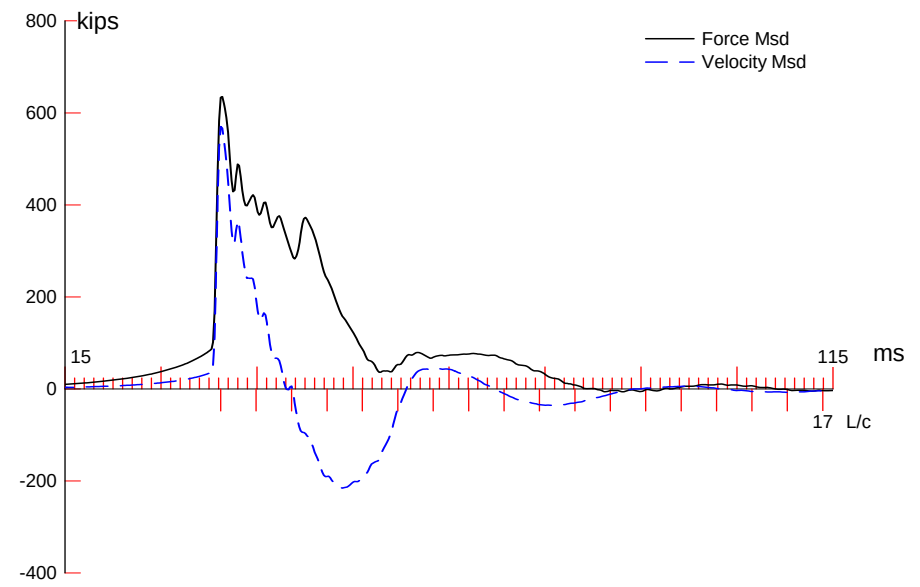
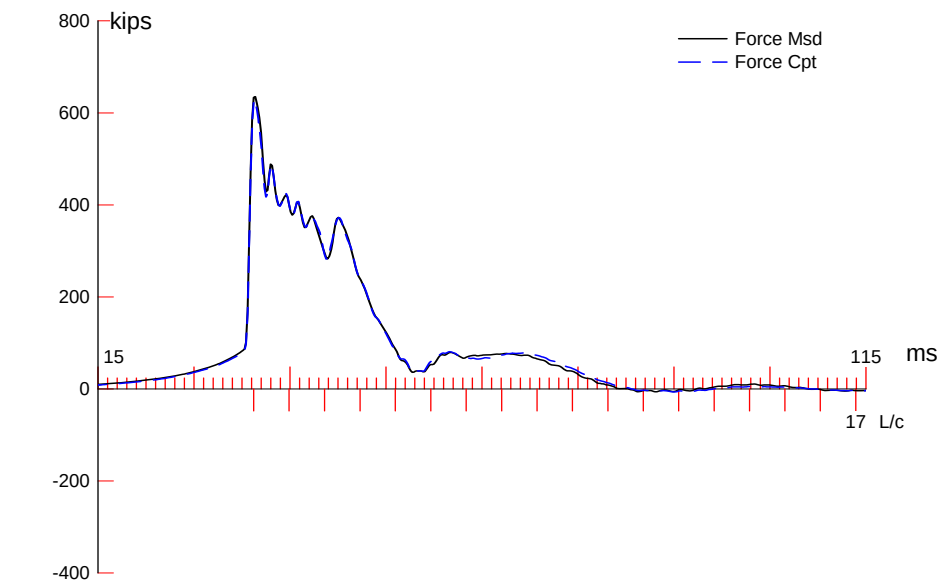
PILE PROFILE AND PILE MODEL

Depth ft	Area in ²	E-Modulus ksi	Spec. Weight lb/ft ³	Perim. ft
0.00	21.40	29992.2	492.000	4.699
77.50	21.40	29992.2	492.000	4.699
Toe Area	1.378	ft ²		

USH 10 over Little Lake Butte des Morts; Pile: Pier 1 #44 EOID Test: 19-Nov-2014 12:11:
 APE D30-42, HP 14 x 73; Blow: 523 CAPWAP(R) 2006-3
 GRL Engineers, Inc. OP: MR

Segmnt Number	Dist. B.G. ft	Impedance kips/ft/s	Imped. Change %	Slack in	Tension Eff.	Compression Slack in	Eff.	Perim. ft	Soil Plug kips
1	3.37	38.20	0.00	0.000	0.000	-0.000	0.000	4.699	0.00
20	67.39	38.20	0.00	0.000	0.000	-0.000	0.000	4.699	0.01
21	70.76	38.20	0.00	0.000	0.000	-0.000	0.000	4.699	0.00
22	74.13	38.20	0.00	0.000	0.000	-0.000	0.000	4.699	0.02
23	77.50	38.20	0.00	0.000	0.000	-0.000	0.000	4.699	0.00

Pile Damping 1.0 %, Time Incr 0.200 ms, Wave Speed 16807.9 ft/s, 2L/c 9.2 ms



USH 10 over Little Lake Butte des Morts; Pile: Pier 1 #44 BOR Test: 20-Nov-2014 07:44:
 APE D30-42, HP 14 x 73; Blow: 3 CAPWAP(R) 2006-3
 GRL Engineers, Inc. OP: MR

CAPWAP SUMMARY RESULTS

Total CAPWAP Capacity:		496.0;	along Shaft	204.0;	at Toe	292.0	kips	
Soil Sgmnt No.	Dist. Below Gages ft	Depth Below Grade ft	Ru kips	Force in Pile kips	Sum of Ru kips	Unit Resist. (Depth) kips/ft	Unit Resist. (Area) ksf	Smith Damping Factor s/ft
				496.0				
1	16.8	8.2	13.0	483.0	13.0	1.59	0.34	0.230
2	23.6	14.9	8.0	475.0	21.0	1.19	0.25	0.230
3	30.3	21.7	10.0	465.0	31.0	1.48	0.32	0.230
4	37.1	28.4	13.0	452.0	44.0	1.93	0.41	0.230
5	43.8	35.1	16.0	436.0	60.0	2.37	0.51	0.230
6	50.5	41.9	14.0	422.0	74.0	2.08	0.44	0.230
7	57.3	48.6	22.0	400.0	96.0	3.26	0.69	0.230
8	64.0	55.4	12.0	388.0	108.0	1.78	0.38	0.230
9	70.8	62.1	48.0	340.0	156.0	7.12	1.52	0.230
10	77.5	68.8	48.0	292.0	204.0	7.12	1.52	0.230
Avg. Shaft			20.4			2.96	0.63	0.230
Toe			292.0				211.83	0.109

Soil Model Parameters/Extensions			Shaft	Toe
Quake	(in)		0.162	0.240
Case Damping Factor			1.228	0.835
Damping Type				Smith
Unloading Quake	(% of loading quake)		100	101
Reloading Level	(% of Ru)		100	100
Unloading Level	(% of Ru)		79	
Resistance Gap (included in Toe Quake)	(in)			0.005
Soil Plug Weight	(kips)			0.18

CAPWAP match quality = 1.28 (Wave Up Match) ; RSA = 0
 Observed: final set = 0.100 in; blow count = 120 b/ft
 Computed: final set = 0.124 in; blow count = 97 b/ft
 max. Top Comp. Stress = 29.3 ksi (T= 35.7 ms, max= 1.052 x Top)
 max. Comp. Stress = 30.9 ksi (Z= 16.8 ft, T= 36.7 ms)
 max. Tens. Stress = -0.57 ksi (Z= 16.8 ft, T= 163.0 ms)
 max. Energy (EMX) = 28.9 kip-ft; max. Measured Top Displ. (DMX)= 0.81 in

USH 10 over Little Lake Butte des Morts; Pile: Pier 1 #44 BOR Test: 20-Nov-2014 07:44:
 APE D30-42, HP 14 x 73; Blow: 3 CAPWAP(R) 2006-3
 GRL Engineers, Inc. OP: MR

EXTREMA TABLE

Pile Sgmnt No.	Dist. Below Gages ft	max. Force kips	min. Force kips	max. Comp. Stress ksi	max. Tens. Stress ksi	max. Trnsfd. Energy kip-ft	max. Veloc. ft/s	max. Displ. in
1	3.4	628.0	-12.0	29.3	-0.56	28.89	15.1	0.812
2	6.7	629.5	-12.0	29.4	-0.56	28.62	15.0	0.792
4	13.5	651.4	-12.3	30.4	-0.57	28.03	14.5	0.750
5	16.8	660.6	-12.3	30.9	-0.57	27.65	14.3	0.726
6	20.2	614.3	-2.3	28.7	-0.11	25.19	14.0	0.701
7	23.6	623.3	-2.2	29.1	-0.10	24.73	13.8	0.674
8	27.0	600.3	0.0	28.0	0.00	23.14	13.5	0.648
9	30.3	611.2	0.0	28.6	0.00	22.72	13.3	0.623
10	33.7	583.4	0.0	27.3	0.00	20.99	12.9	0.597
11	37.1	595.9	0.0	27.8	0.00	20.52	12.6	0.570
12	40.4	560.6	0.0	26.2	0.00	18.53	12.3	0.543
13	43.8	572.4	0.0	26.7	0.00	18.00	12.0	0.514
14	47.2	527.6	0.0	24.6	0.00	15.92	11.7	0.487
15	50.5	541.5	0.0	25.3	0.00	15.44	11.3	0.460
16	53.9	511.0	0.0	23.9	0.00	13.78	10.9	0.434
17	57.3	522.2	0.0	24.4	0.00	13.28	10.6	0.406
18	60.7	464.3	0.0	21.7	0.00	11.25	10.3	0.380
19	64.0	484.7	0.0	22.6	0.00	10.83	10.0	0.355
20	67.4	477.9	0.0	22.3	0.00	9.73	9.3	0.331
21	70.8	488.5	0.0	22.8	0.00	9.33	8.9	0.306
22	74.1	411.3	0.0	19.2	0.00	6.78	9.8	0.284
23	77.5	411.7	0.0	19.2	0.00	4.86	10.1	0.263
Absolute	16.8			30.9			(T =	36.7 ms)
	16.8				-0.57		(T =	163.0 ms)

CASE METHOD

J =	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
RP	757.7	710.6	663.4	616.2	569.1	521.9	474.7	427.6	380.4	333.2
RX	757.7	710.6	663.4	620.6	585.3	565.4	545.6	525.7	505.9	486.6
RU	777.8	732.6	687.4	642.3	597.1	552.0	506.8	461.7	416.5	371.3

RAU = 248.2 (kips); RA2 = 601.6 (kips)

Current CAPWAP Ru = 496.0 (kips); Corresponding J(RP)= 0.55; J(RX) = 0.85

VMX ft/s	TVP ms	VT1*Z kips	FT1 kips	FMX kips	DMX in	DFN in	SET in	EMX kip-ft	QUS kips
15.25	35.48	582.6	646.7	646.7	0.805	0.101	0.100	29.3	775.5

PILE PROFILE AND PILE MODEL

Depth ft	Area in ²	E-Modulus ksi	Spec. Weight lb/ft ³	Perim. ft
0.00	21.40	29992.2	492.000	4.699
77.50	21.40	29992.2	492.000	4.699

Toe Area 1.378 ft²

Top Segment Length 3.37 ft, Top Impedance 38.20 kips/ft/s

Pile Damping 1.0 %, Time Incr 0.200 ms, Wave Speed 16807.9 ft/s, 2L/c 9.2 ms