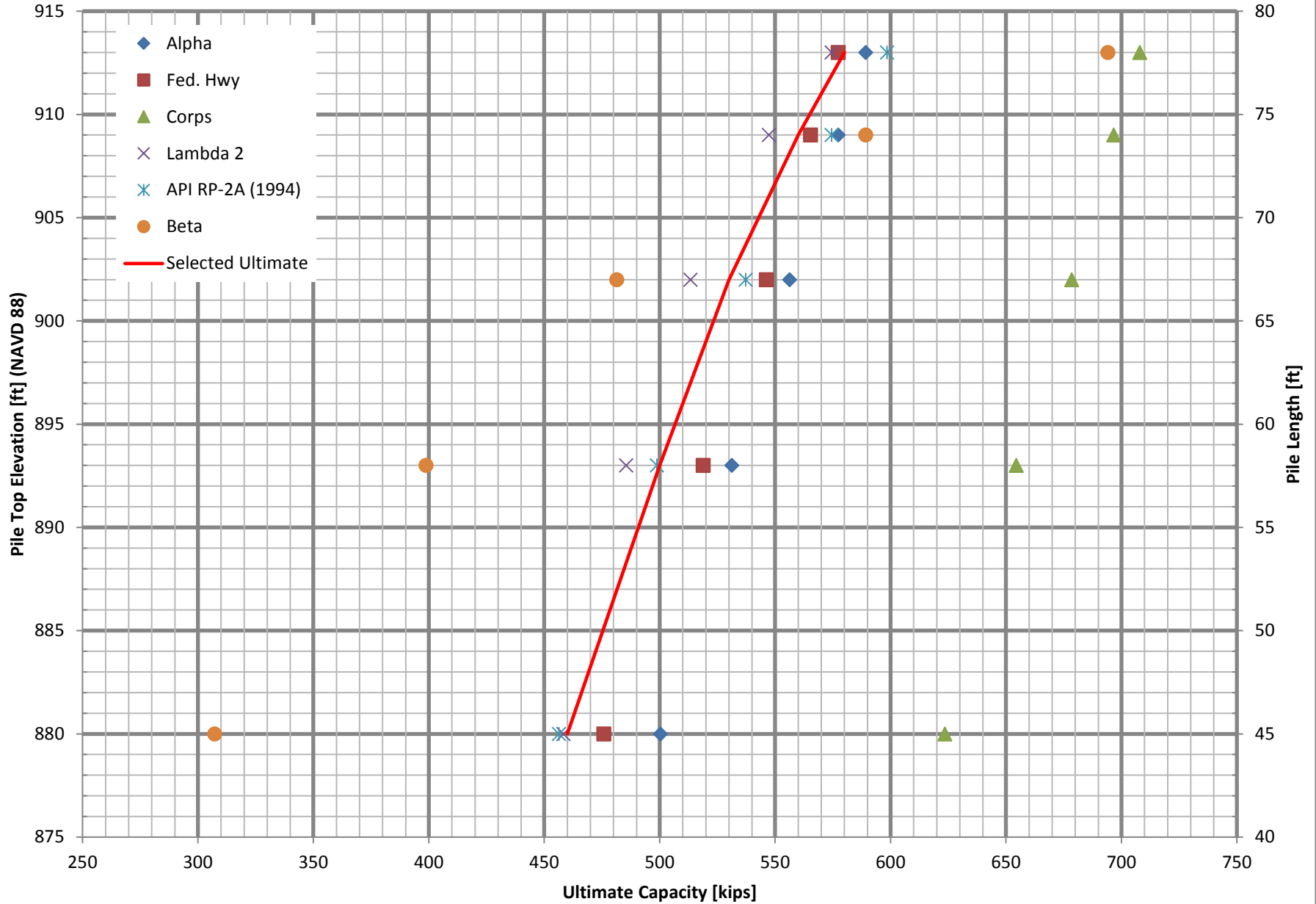


**Attachment D-3:**  
**Pile Capacity Summary Table**  
**And**  
**Pile Capacity Plots for Top of Pile**  
**Elevations**

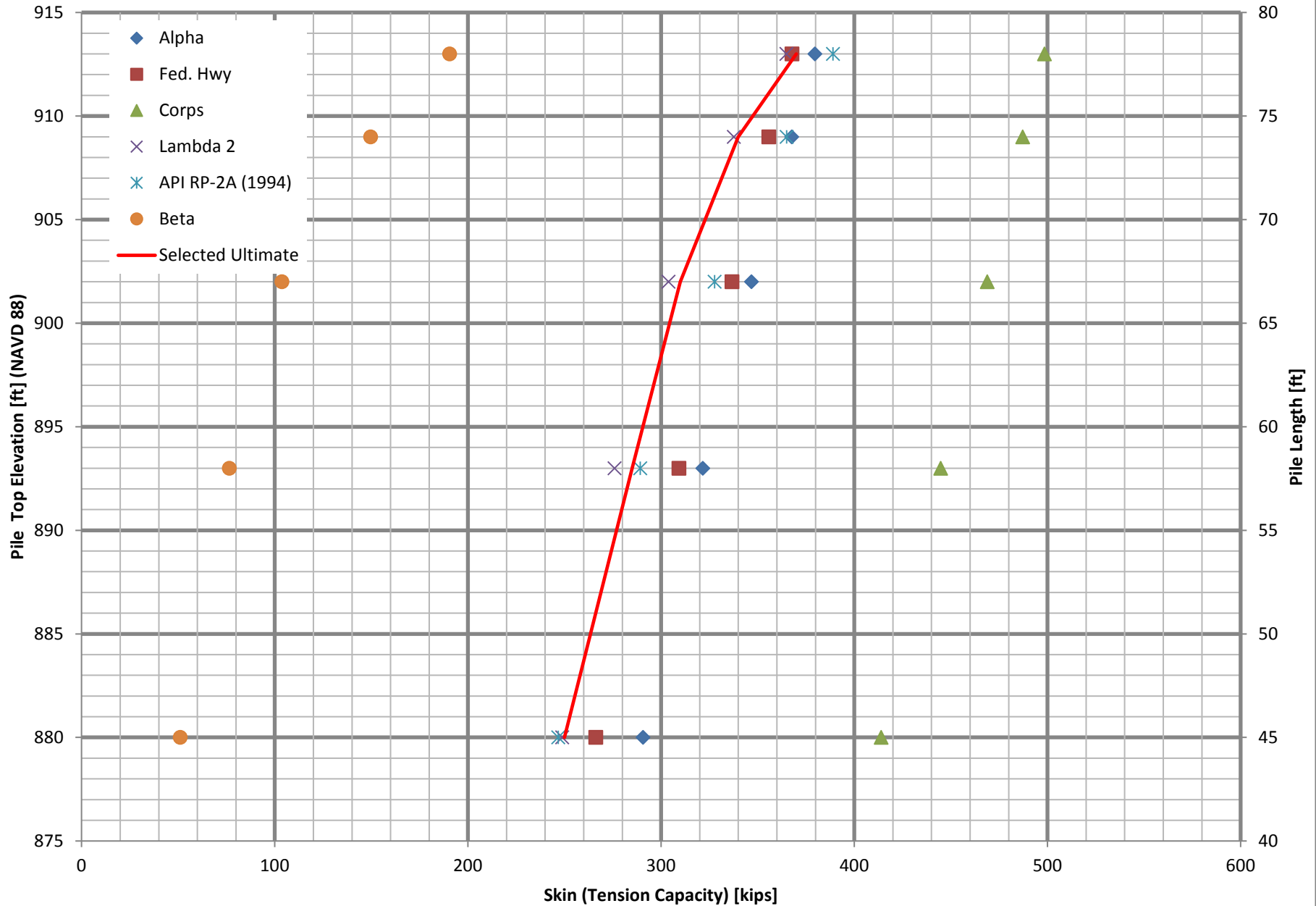
Pile Capacity Summary Table																								
				Skin (Tension Capacity) [kips]							Tip [kips]							Ultimate [kips]						
Pile	Length	Top Pile Elevation	Tip Elevation	Alpha	Fed. Hwy	Corps	Lambda 2	API RP-2A (1994)	Beta	Selected Ultimate	Alpha	Fed. Hwy	Corps	Lambda 2	API RP-2A (1994)	Beta	Selected Ultimate	Alpha	Fed. Hwy	Corps	Lambda 2	API RP-2A (1994)	Beta	Selected Ultimate
14x89	45	880	835	291	266	414	249	247	51	250	210	210	210	210	210	256	210	500	476	624	458	456	307	460
	58	893	835	322	309	445	276	289	76	285	210	210	210	210	210	322	210	531	519	654	486	499	399	500
	67	902	835	347	337	469	304	328	104	310	210	210	210	210	210	378	210	556	546	678	513	537	481	530
	74	909	835	368	356	487	338	365	150	340	210	210	210	210	210	440	210	577	565	697	547	575	589	560
	78	913	835	380	368	498	365	389	191	370	210	210	210	210	210	504	210	589	577	708	575	599	694	580
14x73	45	880	835	287	264	409	246	244	51	250	205	205	205	205	205	250	205	492	468	614	451	449	301	455
	58	893	835	318	306	440	273	286	76	275	205	205	205	205	205	315	205	523	511	644	478	491	390	490
	67	902	835	343	333	463	300	324	103	305	205	205	205	205	205	369	205	547	538	668	505	529	471	515
	74	909	835	363	475	483	324	351	148	335	205	205	205	205	205	429	205	568	679	688	529	556	577	550
	78	913	835	375	485	494	339	366	188	365	205	205	205	205	205	492	205	580	690	699	543	571	680	570

Pile Type	14x89												14x73												
	Skin (Tension Capacity) [kips]				Tip [kips]				Ultimate [kips]				Skin (Tension Capacity) [kips]				Tip [kips]				Ultimate [kips]				
Pile Top Elevation	893	902	909	913	893	902	909	913	893	902	909	913	893	902	909	913	893	902	909	913	893	902	909	913	
Ref. Spacing	58	67	74	78	58	67	74	78	58	67	74	78	58	67	74	78	58	67	74	78	58	67	74	78	
Alpha	322	347	368	380	210	210	210	210	500	556	577	589	287	343	363	375	205	205	205	205	492	547	568	580	
Fed. Hwy	309	337	356	368	210	210	210	210	476	546	565	577	264	333	475	485	205	205	205	205	468	538	679	690	
Corps	445	469	487	498	210	210	210	210	624	678	697	708	409	463	483	494	205	205	205	205	614	668	688	699	
Lambda 2	276	304	338	365	210	210	210	210	458	513	547	575	246	300	324	339	205	205	205	205	451	505	529	543	
API RP-2A (	289	304	338	365	210	210	210	210	456	537	575	599	244	324	351	366	205	205	205	205	449	529	556	571	
Beta	76	104	150	191	256	378	440	504	307	481	589	694	51	103	148	188	250	369	429	492	301	471	577	680	
Average	286	311	339	361	217	238	248	259	470	552	592	624	250	311	357	375	212	232	242	253	462	543	600	627	
St Dev.	119	118	109	98	19	69	94	120	101	67	53	61	116	117	122	112	19	67	92	117	100	67	67	70	
Max	445	469	487	498	256	378	440	504	624	678	697	708	409	463	483	494	250	369	429	492	614	668	688	699	
Min	76	104	150	191	210	210	210	210	307	481	547	575	51	103	148	188	205	205	205	205	301	471	529	543	
Selected Ultimate	0	285	310	340	370	210	210	210	210	500	530	560	580	275	305	335	365	205	205	205	205	490	515	550	570
	70	285	310	340	370	210	210	210	210	500	530	560	580	275	305	335	365	205	205	205	205	490	515	550	570

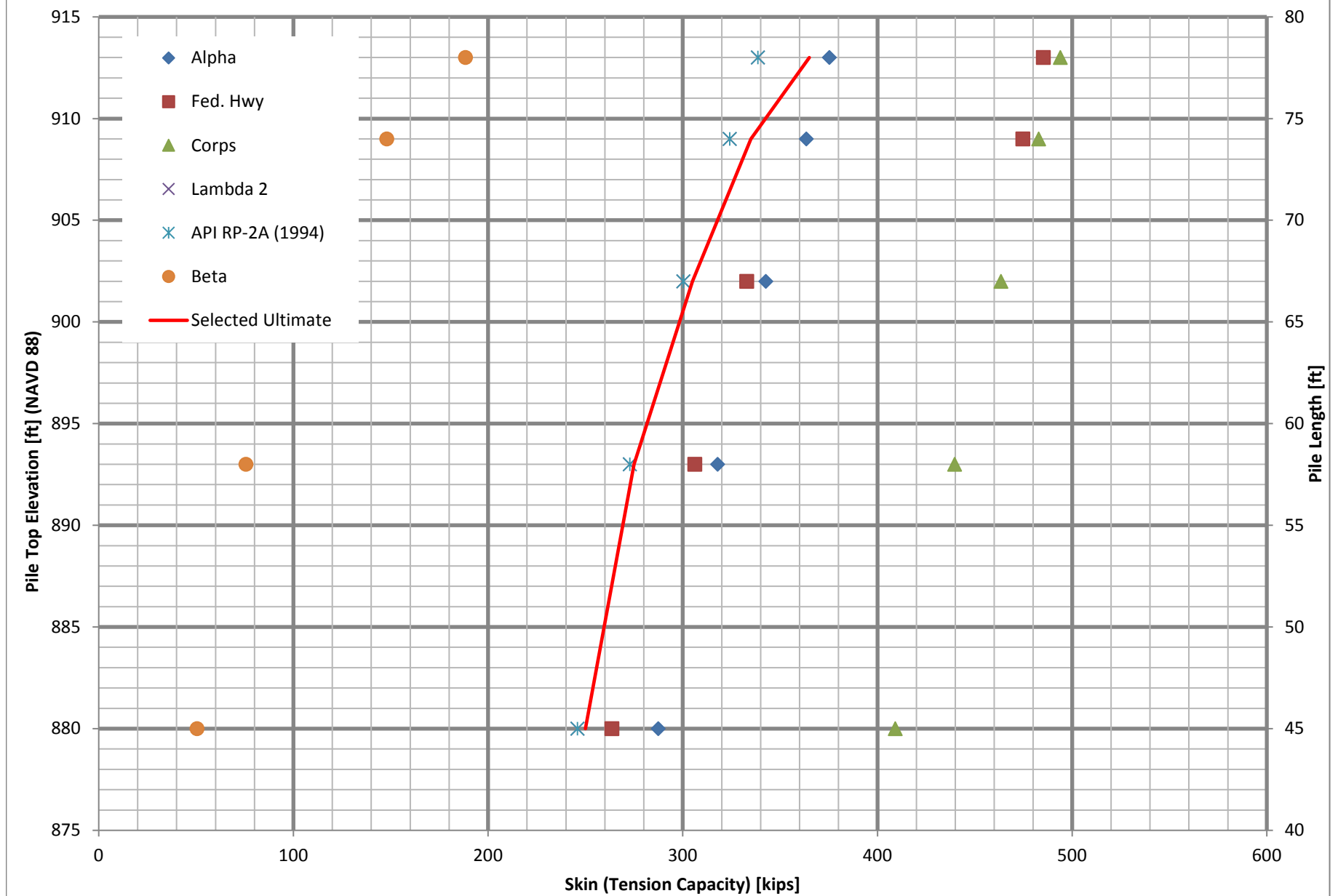
### 14x89 - Ultimate Capacity



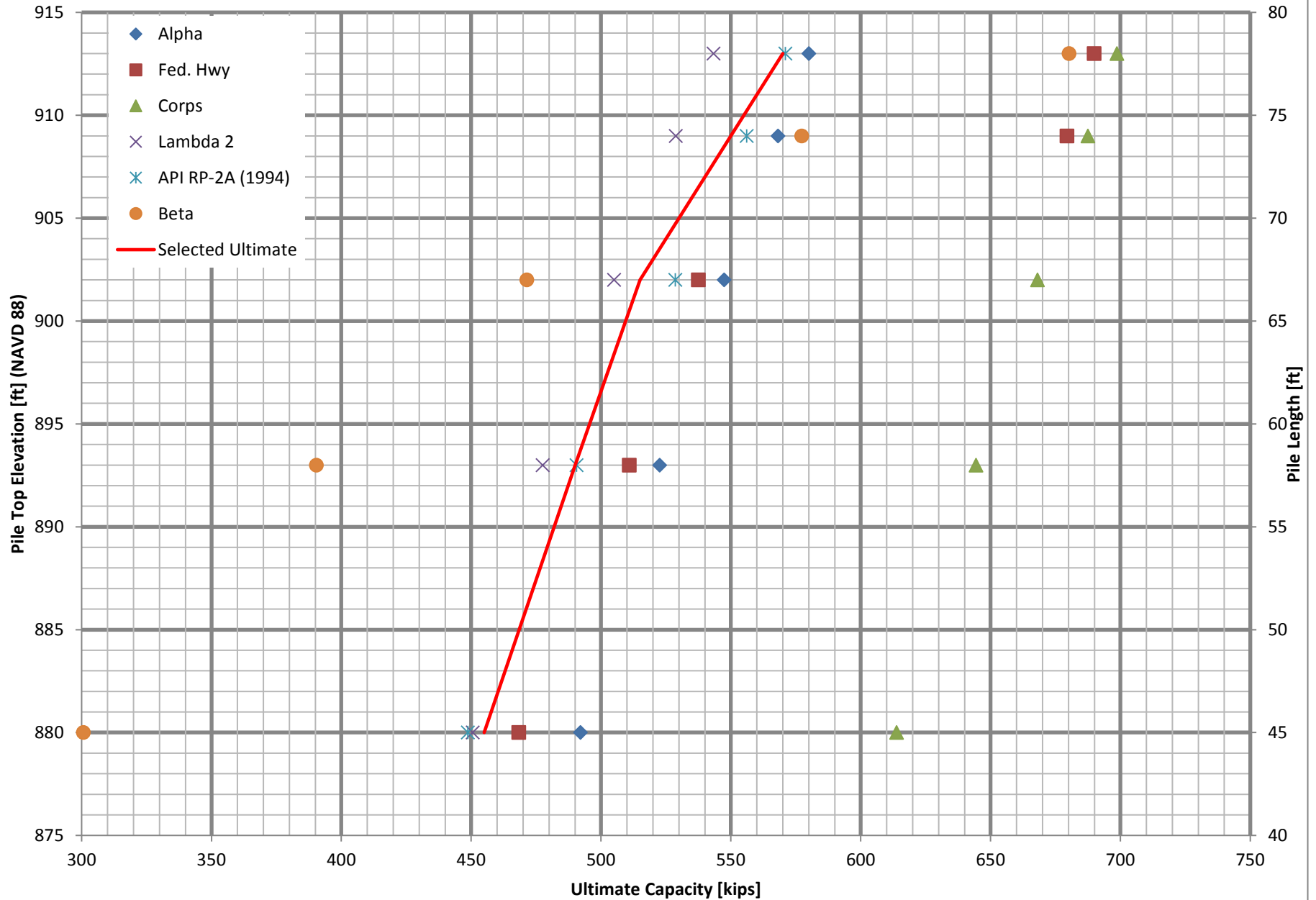
### 14x89 - Skin (Tension Capacity)



### 14x73 - Skin (Tension Capacity) [kips]



### 14x73 - Ultimate Capacity [kips]



## **Example Calculations:**

- (1) Software Program A-Pile Report Summary for Federal Highway, Army Corps, Lambda 2, and Api-RP-2A Methods for a pile at elevation 893
- (2) Excel Spreadsheet for Pile Capacities for each method above

ENTER A FILE NAME FOR YOUR PLOT DATA FILE :

1

AXIALLY LOADING PILE ANALYSIS PROGRAM - APILEplus  
 VERSION 5.0 - (C) COPYRIGHT ENSOFT, INC., 1987-2007.

FMM Inlet: Long HP 14 x 73

DESIGNER : LLS

DATE : 12 MAR 2015

PILE PROPERTIES :

PERIMETER OF PILE WITH NONCIRCULAR SECTION= 56.39 IN.  
 TIP AREA OF PILE WITH NONCIRCULAR SECTION = 1.38 SQF  
 OUTSIDE DIAMETER OF CIRCULAR PILE = 0.00 IN.  
 INTERNAL DIAMETER OF CIRCULAR PILE = 0.00 IN.  
 PILE LENGTH = 58.00 FT.  
 MODULUS OF ELASTICITY = 0.290E+08 PSI

LENGTH OF SURFACE SECTION WITH ZERO SKIN FRICTION = 3.00 FT.  
 INCREMENT OF PILE LENGTH USED IN COMPUTATION = 1.00 FT.

SOIL INFORMATIONS :

DEPTH FT.	SOIL TYPE	LATERAL EARTH PRESSURE	EFFECTIVE UNIT WEIGHT LB/CF	FRICTION ANGLE DEGREES	BEARING CAPACITY FACTOR
0.00	CLAY	0.00	41.60	0.00	0.00
33.00	CLAY	0.00	41.60	0.00	0.00
33.00	CLAY	0.00	43.60	0.00	0.00
48.00	CLAY	0.00	43.60	0.00	0.00
48.00	CLAY	0.00	59.60	0.00	0.00
53.00	CLAY	0.00	59.60	0.00	0.00
53.00	CLAY	0.00	59.60	0.00	0.00
65.00	CLAY	0.00	59.60	0.00	0.00

MAXIMUM UNIT FRICTION KSF	MAXIMUM UNIT BEARING KSF	UNDISTURB SHEAR STRENGTH KSF	REMOLDED SHEAR STRENGTH KSF	BLOW COUNT	UNIT SKIN FRICTION KSF	UNIT END BEARING KSF
0.50	99999.00	0.50	0.00	0.00	0.00	0.00



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0.50	99999.00	0.50	0.00	0.00	0.00	0.00	0.00
0.54	99999.00	0.54	0.00	0.00	0.00	0.00	0.00
0.54	99999.00	0.54	0.00	0.00	0.00	0.00	0.00
13.20	99999.00	13.20	0.00	0.00	0.00	0.00	0.00
13.20	99999.00	13.20	0.00	0.00	0.00	0.00	0.00
16.50	99999.00	16.50	0.00	0.00	0.00	0.00	0.00
16.50	99999.00	16.50	0.00	0.00	0.00	0.00	0.00

1

\*\*\*\*\*  
 \* COMPUTATION RESULT \*  
 \*\*\*\*\*

\*\*\*\*\* \* FED. HWY. METHOD \* \* ARMY CORPS METHOD \* \* LAMBDA 2 METHOD \*  
 \*\*\*\*\*

PILE PENETRATION FT.	TOTAL SKIN FRI C KIP	END BEARING KIP	ULTIM CAPAC-ITY KIP	TOTAL SKIN FRI C KIP	END BEARING KIP	ULTIM CAPAC-ITY KIP	TOTAL SKIN FRI C KIP	END BEARING KIP	ULTIM CAPAC-ITY KIP
0.0	0.0	6.2	6.2	0.0	6.2	6.2	0.0	6.2	6.2
1.0	0.0	6.2	6.2	0.0	6.2	6.2	0.0	6.2	6.2
2.0	0.0	6.2	6.2	0.0	6.2	6.2	0.0	6.2	6.2
3.0	1.2	6.2	7.4	1.2	6.2	7.4	0.0	6.2	6.2
4.0	3.5	6.2	9.7	3.5	6.2	9.7	2.2	6.2	8.4
5.0	5.9	6.2	12.1	5.9	6.2	12.1	3.8	6.2	10.0
6.0	8.2	6.2	14.4	8.2	6.2	14.4	5.3	6.2	11.5
7.0	10.6	6.2	16.8	10.6	6.2	16.8	6.7	6.2	12.9
8.0	12.9	6.2	19.1	12.9	6.2	19.1	8.1	6.2	14.3
9.0	15.3	6.2	21.5	15.3	6.2	21.5	9.5	6.2	15.7
10.0	17.6	6.2	23.8	17.6	6.2	23.8	10.9	6.2	17.1
11.0	20.0	6.2	26.2	20.0	6.2	26.2	12.2	6.2	18.4
12.0	22.3	6.2	28.5	22.3	6.2	28.5	13.6	6.2	19.8
13.0	24.7	6.2	30.9	24.7	6.2	30.9	14.9	6.2	21.1
14.0	27.0	6.2	33.2	27.0	6.2	33.2	16.2	6.2	22.5
15.0	29.4	6.2	35.6	29.4	6.2	35.6	17.6	6.2	23.8
16.0	31.7	6.2	37.9	31.7	6.2	37.9	18.9	6.2	25.1
17.0	34.0	6.2	40.2	34.1	6.2	40.3	20.3	6.2	26.5
18.0	36.4	6.2	42.6	36.4	6.2	42.6	21.6	6.2	27.8
19.0	38.7	6.2	44.9	38.8	6.2	45.0	22.9	6.2	29.1
20.0	41.1	6.2	47.3	41.1	6.2	47.3	24.3	6.2	30.5
21.0	43.4	6.2	49.6	43.5	6.2	49.7	25.6	6.2	31.8
22.0	45.8	6.2	52.0	45.8	6.2	52.0	27.0	6.2	33.2
23.0	48.1	6.2	54.3	48.2	6.2	54.4	28.3	6.2	34.5
24.0	50.5	6.2	56.7	50.5	6.2	56.7	29.7	6.2	35.9
25.0	52.8	6.2	59.0	52.9	6.2	59.1	31.0	6.2	37.2
26.0	55.2	6.2	61.4	55.2	6.2	61.4	32.4	6.2	38.6
27.0	57.5	6.2	63.7	57.6	6.2	63.8	33.7	6.2	39.9
28.0	59.9	6.2	66.1	59.9	6.2	66.1	35.1	6.2	41.3
29.0	62.2	6.2	68.4	62.3	6.2	68.5	36.5	6.2	42.7
30.0	64.6	6.2	70.8	64.6	6.2	70.8	37.9	6.2	44.1
31.0	66.9	6.4	73.3	67.0	6.4	73.3	39.2	6.4	45.6
32.0	69.3	6.5	75.8	69.3	6.5	75.8	40.6	6.5	47.2
33.0	71.6	6.7	78.3	71.7	6.7	78.4	42.0	6.7	48.7
34.0	74.1	6.7	80.8	74.1	6.7	80.8	43.4	6.7	50.1
35.0	76.6	6.7	83.3	76.6	6.7	83.3	44.9	6.7	51.6
36.0	79.1	6.7	85.8	79.1	6.7	85.8	46.3	6.7	53.0
37.0	81.7	6.7	88.4	81.5	6.7	88.2	47.8	6.7	54.5

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38.0	84.2	6.7	90.9	84.0	6.7	90.7	49.2	6.7	55.9
39.0	86.7	6.7	93.4	86.5	6.7	93.2	50.7	6.7	57.4
40.0	89.3	6.7	96.0	89.0	6.7	95.7	52.1	6.7	58.8
41.0	91.8	6.7	98.5	91.5	6.7	98.2	53.6	6.7	60.3
42.0	94.3	6.7	101.0	94.0	6.7	100.7	55.0	6.7	61.7
43.0	96.9	6.7	103.6	96.5	6.7	103.2	56.5	6.7	63.2
44.0	99.4	6.7	106.1	98.9	6.7	105.6	58.0	6.7	64.7
45.0	101.9	6.7	108.6	101.4	6.7	108.1	59.4	6.7	66.1
46.0	104.5	58.8	163.2	103.9	58.8	162.7	60.9	58.8	119.7
47.0	107.0	111.3	218.3	106.4	111.3	217.7	62.4	111.3	173.6
48.0	109.6	163.8	273.3	108.9	163.8	272.7	63.8	163.8	227.6
49.0	120.0	163.8	283.8	125.6	163.8	289.4	80.8	163.8	244.6
50.0	138.4	163.8	302.2	156.7	163.8	320.4	99.6	163.8	263.3
51.0	156.8	177.3	334.1	187.7	177.3	365.0	118.4	177.3	295.7
52.0	175.2	191.0	366.2	218.7	191.0	409.7	137.2	191.0	328.2
53.0	193.6	204.7	398.3	249.7	204.7	454.4	156.1	204.7	360.8
54.0	214.3	204.7	419.0	284.6	204.7	489.3	179.3	204.7	384.0
55.0	237.3	204.7	442.0	323.4	204.7	528.1	202.6	204.7	407.3
56.0	260.3	204.7	465.0	362.1	204.7	566.8	226.0	204.7	430.7
57.0	283.2	204.7	487.9	400.9	204.7	605.6	249.3	204.7	454.0
58.0	306.2	204.7	510.9	439.7	204.7	644.4	272.8	204.7	477.5

\*\*\*\*\*  
 \* API RP-2A (1994) \*  
 \*\*\*\*\*

PILE PENETRATI ON FT.	TOTAL SKI N FRI CTI ON KIP	END BEARI NG KIP	ULTI MATE CAPACI TY KIP
0.00	0.0	6.2	6.2
1.00	0.0	6.2	6.2
2.00	0.0	6.2	6.2
3.00	0.4	6.2	6.6
4.00	1.3	6.2	7.5
5.00	2.2	6.2	8.4
6.00	3.2	6.2	9.4
7.00	4.2	6.2	10.4
8.00	5.2	6.2	11.4
9.00	6.3	6.2	12.5
10.00	7.4	6.2	13.6
11.00	8.5	6.2	14.7
12.00	9.7	6.2	15.9
13.00	10.9	6.2	17.1
14.00	12.1	6.2	18.3
15.00	13.4	6.2	19.6
16.00	14.8	6.2	21.0
17.00	16.1	6.2	22.3
18.00	17.6	6.2	23.8
19.00	19.0	6.2	25.2
20.00	20.5	6.2	26.7
21.00	22.0	6.2	28.2
22.00	23.6	6.2	29.8
23.00	25.2	6.2	31.4
24.00	26.9	6.2	33.1
25.00	28.5	6.2	34.7
26.00	30.2	6.2	36.5
27.00	32.0	6.2	38.2
28.00	33.8	6.2	40.0
29.00	35.6	6.2	41.8
30.00	37.4	6.2	43.6
31.00	39.3	6.4	45.7

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32.00	41.2	6.5	47.7
33.00	43.1	6.7	49.8
34.00	45.1	6.7	51.8
35.00	47.2	6.7	53.9
36.00	49.3	6.7	56.0
37.00	51.4	6.7	58.1
38.00	53.6	6.7	60.3
39.00	55.8	6.7	62.5
40.00	58.0	6.7	64.7
41.00	60.3	6.7	67.0
42.00	62.5	6.7	69.2
43.00	64.8	6.7	71.5
44.00	67.2	6.7	73.9
45.00	69.5	6.7	76.2
46.00	71.9	58.8	130.7
47.00	74.4	111.3	185.6
48.00	76.8	163.8	240.6
49.00	87.8	163.8	251.6
50.00	107.4	163.8	271.2
51.00	127.2	177.3	304.5
52.00	147.1	191.0	338.1
53.00	167.1	204.7	371.8
54.00	189.1	204.7	393.8
55.00	213.1	204.7	417.8
56.00	237.2	204.7	441.9
57.00	261.5	204.7	466.2
58.00	285.9	204.7	490.6

AN ASTERISK WILL BE PLACED IN THE END-BEARING COLUMN IF THE TIP RESISTANCE IS CONTROLLED BY THE FRICTION OF SOIL PLUG INSIDE AN OPEN-ENDED PIPE PILE.

\*\*\*\*\*  
 \* COMPUTE LOAD-DISTRIBUTION AND LOAD-SETTLEMENT \*  
 \* CURVES FOR AXIAL LOADING \*  
 \*\*\*\*\*

T-Z CURVE NO.	NO. OF POINTS	DEPTH TO CURVE FT.	LOAD TRANSFER PSI	PILE MOVEMENT IN.
1	10	0.0000E+00	0.0000E+00	0.0000E+00
			0.0000E+00	0.2872E-01
			0.0000E+00	0.5564E-01
			0.0000E+00	0.1023E+00
			0.0000E+00	0.1436E+00
			0.0000E+00	0.1795E+00
			0.0000E+00	0.3590E+00
			0.0000E+00	0.5385E+00
			0.0000E+00	0.8975E+00
			0.0000E+00	0.3590E+01
2	10	0.1652E+02	0.0000E+00	0.0000E+00
			0.6102E+00	0.2872E-01
			0.1017E+01	0.5564E-01
			0.1525E+01	0.1023E+00
			0.1831E+01	0.1436E+00
			0.2034E+01	0.1795E+00
			0.1831E+01	0.3590E+00

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3	10	0. 3296E+02	0. 1831E+01	0. 5385E+00
			0. 1831E+01	0. 8975E+00
			0. 1831E+01	0. 3590E+01
			0. 0000E+00	0. 0000E+00
			0. 8564E+00	0. 2872E-01
			0. 1427E+01	0. 5564E-01
			0. 2141E+01	0. 1023E+00
			0. 2569E+01	0. 1436E+00
			0. 2855E+01	0. 1795E+00
			0. 2569E+01	0. 3590E+00
4	10	0. 3300E+02	0. 2569E+01	0. 5385E+00
			0. 2569E+01	0. 8975E+00
			0. 2569E+01	0. 3590E+01
			0. 0000E+00	0. 0000E+00
			0. 8870E+00	0. 2872E-01
			0. 1478E+01	0. 5564E-01
			0. 2218E+01	0. 1023E+00
			0. 2661E+01	0. 1436E+00
			0. 2957E+01	0. 1795E+00
			0. 2661E+01	0. 3590E+00
5	10	0. 4052E+02	0. 2661E+01	0. 5385E+00
			0. 2661E+01	0. 8975E+00
			0. 2661E+01	0. 3590E+01
			0. 0000E+00	0. 0000E+00
			0. 9980E+00	0. 2872E-01
			0. 1663E+01	0. 5564E-01
			0. 2495E+01	0. 1023E+00
			0. 2994E+01	0. 1436E+00
			0. 3327E+01	0. 1795E+00
			0. 2994E+01	0. 3590E+00
6	10	0. 4796E+02	0. 2994E+01	0. 5385E+00
			0. 2994E+01	0. 8975E+00
			0. 2994E+01	0. 3590E+01
			0. 0000E+00	0. 0000E+00
			0. 1084E+01	0. 2872E-01
			0. 1806E+01	0. 5564E-01
			0. 2710E+01	0. 1023E+00
			0. 3252E+01	0. 1436E+00
			0. 3613E+01	0. 1795E+00
			0. 3252E+01	0. 3590E+00
7	10	0. 4800E+02	0. 3252E+01	0. 5385E+00
			0. 3252E+01	0. 8975E+00
			0. 3252E+01	0. 3590E+01
			0. 0000E+00	0. 0000E+00
			0. 4880E+01	0. 2872E-01
			0. 8133E+01	0. 5564E-01
			0. 1220E+02	0. 1023E+00
			0. 1464E+02	0. 1436E+00
			0. 1627E+02	0. 1795E+00
			0. 1464E+02	0. 3590E+00
8	10	0. 5052E+02	0. 1464E+02	0. 5385E+00
			0. 1464E+02	0. 8975E+00
			0. 1464E+02	0. 3590E+01
			0. 0000E+00	0. 0000E+00
			0. 8761E+01	0. 2872E-01
			0. 1460E+02	0. 5564E-01
			0. 2190E+02	0. 1023E+00

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			0. 2628E+02	0. 1436E+00
			0. 2920E+02	0. 1795E+00
			0. 2628E+02	0. 3590E+00
			0. 2628E+02	0. 5385E+00
			0. 2628E+02	0. 8975E+00
			0. 2628E+02	0. 3590E+01
9	10	0. 5296E+02		
			0. 0000E+00	0. 0000E+00
			0. 8879E+01	0. 2872E-01
			0. 1480E+02	0. 5564E-01
			0. 2220E+02	0. 1023E+00
			0. 2664E+02	0. 1436E+00
			0. 2960E+02	0. 1795E+00
			0. 2664E+02	0. 3590E+00
			0. 2664E+02	0. 5385E+00
			0. 2664E+02	0. 8975E+00
			0. 2664E+02	0. 3590E+01
10	10	0. 5300E+02		
			0. 0000E+00	0. 0000E+00
			0. 9752E+01	0. 2872E-01
			0. 1625E+02	0. 5564E-01
			0. 2438E+02	0. 1023E+00
			0. 2926E+02	0. 1436E+00
			0. 3251E+02	0. 1795E+00
			0. 2926E+02	0. 3590E+00
			0. 2926E+02	0. 5385E+00
			0. 2926E+02	0. 8975E+00
			0. 2926E+02	0. 3590E+01
11	10	0. 5902E+02		
			0. 0000E+00	0. 0000E+00
			0. 1082E+02	0. 2872E-01
			0. 1804E+02	0. 5564E-01
			0. 2705E+02	0. 1023E+00
			0. 3246E+02	0. 1436E+00
			0. 3607E+02	0. 1795E+00
			0. 3246E+02	0. 3590E+00
			0. 3246E+02	0. 5385E+00
			0. 3246E+02	0. 8975E+00
			0. 3246E+02	0. 3590E+01
12	10	0. 6496E+02		
			0. 0000E+00	0. 0000E+00
			0. 1082E+02	0. 2872E-01
			0. 1804E+02	0. 5564E-01
			0. 2705E+02	0. 1023E+00
			0. 3246E+02	0. 1436E+00
			0. 3607E+02	0. 1795E+00
			0. 3246E+02	0. 3590E+00
			0. 3246E+02	0. 5385E+00
			0. 3246E+02	0. 8975E+00
			0. 3246E+02	0. 3590E+01
TIP	LOAD	TIP	MOVEMENT	
	KIP		IN.	
0. 0000E+00		0. 0000E+00		
0. 1279E+02		0. 8975E-02		
0. 2559E+02		0. 1795E-01		
0. 5118E+02		0. 3590E-01		
0. 1024E+03		0. 2333E+00		
0. 1535E+03		0. 7539E+00		
0. 1842E+03		0. 1310E+01		

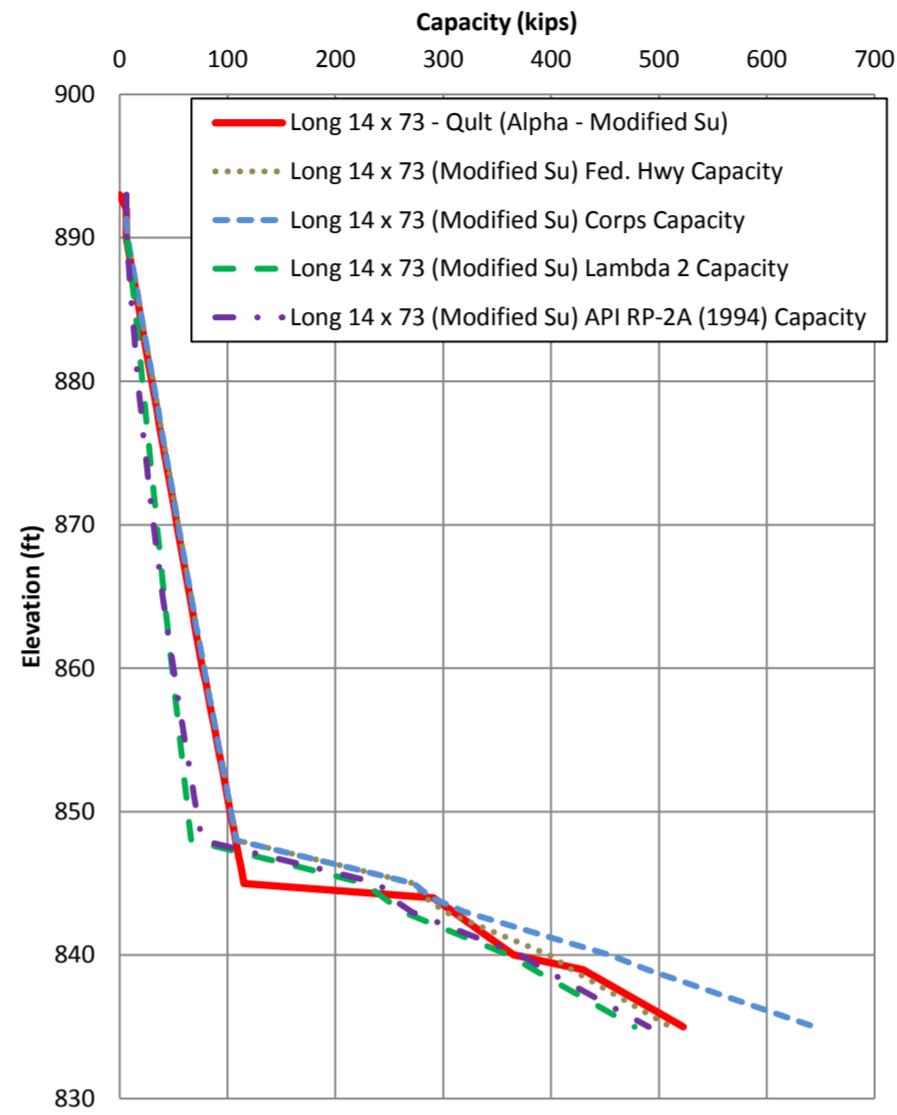
	FM_Inlet_Long_HP14x73_20150313_893.apo
0. 2047E+03	0. 1795E+01
0. 2047E+03	0. 2692E+01
0. 2047E+03	0. 3590E+01

LOAD VERSUS SETTLEMENT CURVE  
 \*\*\*\*\*

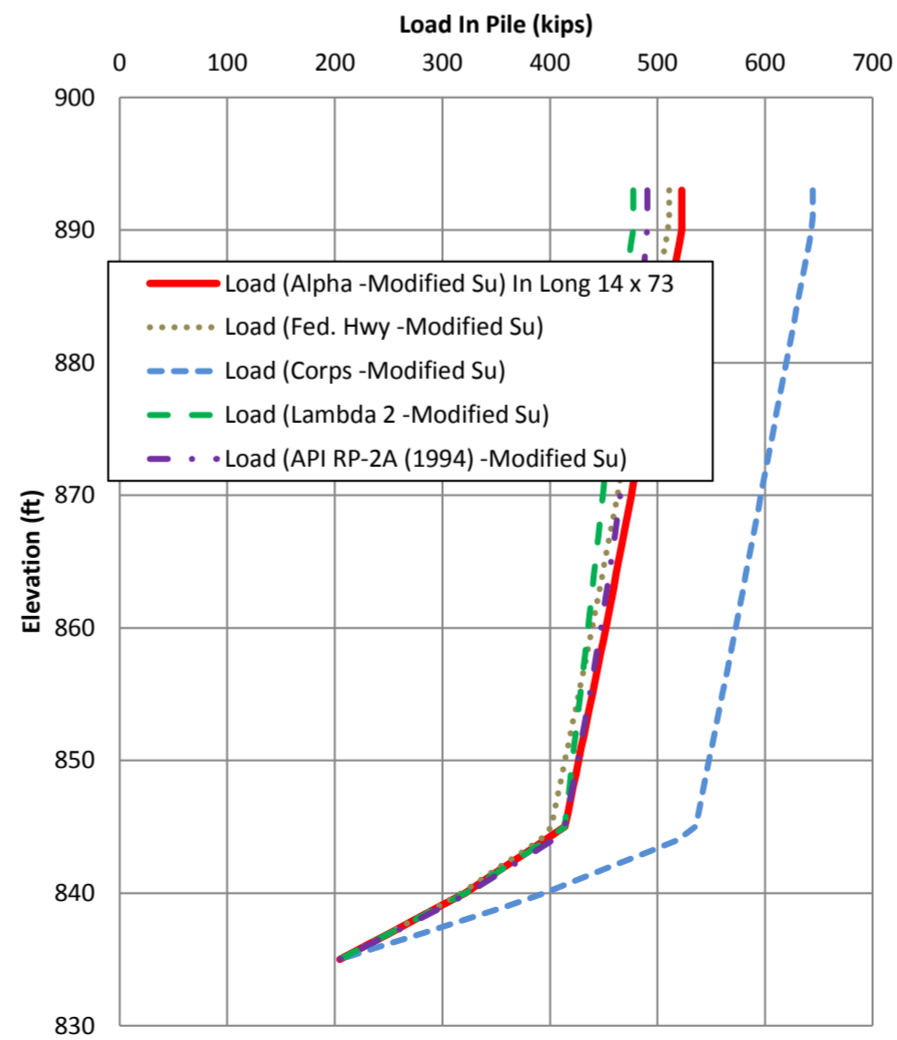
TOP LOAD KIP	TOP MOVEMENT IN.	TIP LOAD KIP	TIP MOVEMENT IN.
0. 4470E+00	0. 1466E-03	0. 1426E+00	0. 1000E-03
0. 4470E+01	0. 1466E-02	0. 1426E+01	0. 1000E-02
0. 2235E+02	0. 7330E-02	0. 7128E+01	0. 5000E-02
0. 4470E+02	0. 1466E-01	0. 1426E+02	0. 1000E-01
0. 1854E+03	0. 6934E-01	0. 5483E+02	0. 5000E-01
0. 2744E+03	0. 1284E+00	0. 6779E+02	0. 1000E+00
0. 3750E+03	0. 5399E+00	0. 1286E+03	0. 5000E+00
0. 4135E+03	0. 1045E+01	0. 1671E+03	0. 1000E+01
0. 4511E+03	0. 2049E+01	0. 2047E+03	0. 2000E+01

Elev.	Metho Pile Penetration	Fed. Hwy			Corps			Lambda 2			API RP-2A (1994)		
		Long 14 x 73 (Modified Su) Fed. Hwy Skin	Long 14 x 73 (Modified Su) Fed. Hwy Bearing	Long 14 x 73 (Modified Su) Fed. Hwy Capacity	Long 14 x 73 (Modified Su) Corps Skin	Long 14 x 73 (Modified Su) Corps Bearing	Long 14 x 73 (Modified Su) Corps Capacity	Long 14 x 73 (Modified Su) Lambda 2 Skin	Long 14 x 73 (Modified Su) Lambda 2 Bearing	Long 14 x 73 (Modified Su) Lambda 2 Capacity	Long 14 x 73 (Modified Su) API RP 2A (1994) Skin	Long 14 x 73 (Modified Su) API RP 2A (1994) Bearing	Long 14 x 73 (Modified Su) API RP 2A (1994) Capacity
ft	ft	kip	kip	kip	kip	kip	kip	kip	kip	kip	kip	kip	kip
Max Value		306.2	204.7	510.9	439.7	204.7	644.4	272.8	204.7	477.5	285.9	204.7	490.6
893	0	0	6	6	0	6	6	0	6	6	0	6	6
892	1	0	6	6	0	6	6	0	6	6	0	6	6
891	2	0	6	6	0	6	6	0	6	6	0	6	6
890	3	1	6	7	1	6	7	0	6	6	0	6	7
889	4	4	6	10	4	6	10	2	6	8	1	6	8
888	5	6	6	12	6	6	12	4	6	10	2	6	8
887	6	8	6	14	8	6	14	5	6	12	3	6	9
886	7	11	6	17	11	6	17	7	6	13	4	6	10
885	8	13	6	19	13	6	19	8	6	14	5	6	11
884	9	15	6	22	15	6	22	10	6	16	6	6	13
883	10	18	6	24	18	6	24	11	6	17	7	6	14
882	11	20	6	26	20	6	26	12	6	18	9	6	15
881	12	22	6	29	22	6	29	14	6	20	10	6	16
880	13	25	6	31	25	6	31	15	6	21	11	6	17
879	14	27	6	33	27	6	33	16	6	23	12	6	18
878	15	29	6	36	29	6	36	18	6	24	13	6	20
877	16	32	6	38	32	6	38	19	6	25	15	6	21
876	17	34	6	40	34	6	40	20	6	27	16	6	22
875	18	36	6	43	36	6	43	22	6	28	18	6	24
874	19	39	6	45	39	6	45	23	6	29	19	6	25
873	20	41	6	47	41	6	47	24	6	31	21	6	27
872	21	43	6	50	44	6	50	26	6	32	22	6	28
871	22	46	6	52	46	6	52	27	6	33	24	6	30
870	23	48	6	54	48	6	54	28	6	35	25	6	31
869	24	51	6	57	51	6	57	30	6	36	27	6	33
868	25	53	6	59	53	6	59	31	6	37	29	6	35
867	26	55	6	61	55	6	61	32	6	39	30	6	37
866	27	58	6	64	58	6	64	34	6	40	32	6	38
865	28	60	6	66	60	6	66	35	6	41	34	6	40
864	29	62	6	68	62	6	69	37	6	43	36	6	42
863	30	65	6	71	65	6	71	38	6	44	37	6	44
862	31	67	6	73	67	6	73	39	6	46	39	6	46
861	32	69	7	76	69	7	76	41	7	47	41	7	48
860	33	72	7	78	72	7	78	42	7	49	43	7	50
859	34	74	7	81	74	7	81	43	7	50	45	7	52
858	35	77	7	83	77	7	83	45	7	52	47	7	54
857	36	79	7	86	79	7	86	46	7	53	49	7	56
856	37	82	7	88	82	7	88	48	7	55	51	7	58
855	38	84	7	91	84	7	91	49	7	56	54	7	60
854	39	87	7	93	87	7	93	51	7	57	56	7	63
853	40	89	7	96	89	7	96	52	7	59	58	7	65
852	41	92	7	99	92	7	98	54	7	60	60	7	67
851	42	94	7	101	94	7	101	55	7	62	63	7	69
850	43	97	7	104	97	7	103	57	7	63	65	7	72
849	44	99	7	106	99	7	106	58	7	65	67	7	74
848	45	102	7	109	101	7	108	59	7	66	70	7	76
847	46	105	59	163	104	59	163	61	59	120	72	59	131
846	47	107	111	218	106	111	218	62	111	174	74	111	186
845	48	110	164	273	109	164	273	64	164	228	77	164	241
844	49	120	164	284	126	164	289	81	164	245	88	164	252
843	50	138	164	302	157	164	320	100	164	263	107	164	271
842	51	157	177	334	188	177	365	118	177	296	127	177	305
841	52	175	191	366	219	191	410	137	191	328	147	191	338
840	53	194	205	398	250	205	454	156	205	361	167	205	372
839	54	214	205	419	285	205	489	179	205	384	189	205	394
838	55	237	205	442	323	205	528	203	205	407	213	205	418
837	56	260	205	465	362	205	567	226	205	431	237	205	442
836	57	283	205	488	401	205	606	249	205	454	262	205	466
835	58	306	205	511	440	205	644	273	205	478	286	205	491

### Long 14 x 73 (Modified Su) Capacity Comparisons



### Long 14 x 73 (Modified Su) Capacity Comparisons



Load In Pile	Load (Fed. Hwy - Modified Su)	Load (Corps - Modified Su)	Load (Lambda 2 - Modified Su)	Load (API RP-2A (1994) - Modified Su)
511	644	478	491	
511	644	478	491	
511	644	478	491	
510	643	478	490	
507	641	475	489	
505	639	474	488	
503	636	472	487	
500	634	471	486	
498	632	469	485	
496	629	468	484	
493	627	467	483	
491	624	465	482	
489	622	464	481	
486	620	463	480	
484	617	461	479	
482	615	460	477	
479	613	459	476	
477	610	457	475	
475	608	456	473	
472	606	455	472	
470	603	453	470	
468	601	452	469	
465	599	451	467	
463	596	449	465	
460	594	448	464	
458	592	447	462	
456	589	445	460	
453	587	444	459	
451	585	442	457	
449	582	441	455	
446	580	440	453	
444	577	438	451	
442	575	437	449	
439	573	436	448	
437	570	434	446	
434	568	433	443	
432	565	431	441	
429	563	430	439	
427	560	428	437	
424	558	427	435	
422	555	425	433	
419	553	424	430	
417	550	423	428	
414	548	421	426	
412	546	420	423	
409	543	418	421	
406	541	417	419	
404	538	415	416	
401	536	414	414	
391	519	397	403	
373	488	378	383	
354	457	359	363	
336	426	340	344	
317	395	321	324	
297	360	298	302	
274	321	275	278	
251	282	252	253	
228	244	228	229	
205	205	205	205	

ENTER A FILE NAME FOR YOUR PLOT DATA FILE :

1

AXIALLY LOADING PILE ANALYSIS PROGRAM - APILEplus  
 VERSION 5.0 - (C) COPYRIGHT ENSOFT, INC., 1987-2007.

FMM Inlet: Long HP 14 x 89

DESIGNER : KAH

DATE : 23 DEC 2014

PILE PROPERTIES :

PERIMETER OF PILE WITH NONCIRCULAR SECTION= 57.05 IN.  
 TIP AREA OF PILE WITH NONCIRCULAR SECTION = 1.41 SQF  
 OUTSIDE DIAMETER OF CIRCULAR PILE = 0.00 IN.  
 INTERNAL DIAMETER OF CIRCULAR PILE = 0.00 IN.  
 PILE LENGTH = 58.00 FT.  
 MODULUS OF ELASTICITY = 0.290E+08 PSI

LENGTH OF SURFACE SECTION WITH ZERO SKIN FRICTION = 3.00 FT.  
 INCREMENT OF PILE LENGTH USED IN COMPUTATION = 1.00 FT.

SOIL INFORMATIONS :

DEPTH FT.	SOIL TYPE	LATERAL EARTH PRESSURE	EFFECTIVE UNIT WEIGHT LB/CF	FRICTION ANGLE DEGREES	BEARING CAPACITY FACTOR
0.00	CLAY	0.00	41.60	0.00	0.00
33.00	CLAY	0.00	41.60	0.00	0.00
33.00	CLAY	0.00	43.60	0.00	0.00
48.00	CLAY	0.00	43.60	0.00	0.00
48.00	CLAY	0.00	59.60	0.00	0.00
53.00	CLAY	0.00	59.60	0.00	0.00
53.00	CLAY	0.00	59.60	0.00	0.00
65.00	CLAY	0.00	59.60	0.00	0.00

MAXIMUM UNIT FRICTION KSF	MAXIMUM UNIT BEARING KSF	UNDISTURB SHEAR STRENGTH KSF	REMOLDED SHEAR STRENGTH KSF	BLOW COUNT	UNIT SKIN FRICTION KSF	UNIT END BEARING KSF
0.50	99999.00	0.50	0.00	0.00	0.00	0.00



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0.50	99999.00	0.50	0.00	0.00	0.00	0.00	0.00
0.54	99999.00	0.54	0.00	0.00	0.00	0.00	0.00
0.54	99999.00	0.54	0.00	0.00	0.00	0.00	0.00
13.20	99999.00	13.20	0.00	0.00	0.00	0.00	0.00
13.20	99999.00	13.20	0.00	0.00	0.00	0.00	0.00
16.50	99999.00	16.50	0.00	0.00	0.00	0.00	0.00
16.50	99999.00	16.50	0.00	0.00	0.00	0.00	0.00

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 \* COMPUTATION RESULT \*  
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\*\*\*\*\* \* FED. HWY. METHOD \* \* ARMY CORPS METHOD \* \* LAMBDA 2 METHOD \*  
 \*\*\*\*\*

PILE PENETRATION FT.	TOTAL SKIN FRICTION KIP	END BEARING KIP	ULTIM CAPACITY KIP	TOTAL SKIN FRICTION KIP	END BEARING KIP	ULTIM CAPACITY KIP	TOTAL SKIN FRICTION KIP	END BEARING KIP	ULTIM CAPACITY KIP
0.0	0.0	6.3	6.3	0.0	6.3	6.3	0.0	6.3	6.3
1.0	0.0	6.3	6.3	0.0	6.3	6.3	0.0	6.3	6.3
2.0	0.0	6.3	6.3	0.0	6.3	6.3	0.0	6.3	6.3
3.0	1.2	6.3	7.5	1.2	6.3	7.5	0.0	6.3	6.3
4.0	3.6	6.3	9.9	3.6	6.3	9.9	2.2	6.3	8.5
5.0	5.9	6.3	12.3	5.9	6.3	12.3	3.8	6.3	10.2
6.0	8.3	6.3	14.7	8.3	6.3	14.7	5.3	6.3	11.7
7.0	10.7	6.3	17.0	10.7	6.3	17.0	6.8	6.3	13.1
8.0	13.1	6.3	19.4	13.1	6.3	19.4	8.2	6.3	14.6
9.0	15.4	6.3	21.8	15.5	6.3	21.8	9.6	6.3	16.0
10.0	17.8	6.3	24.2	17.8	6.3	24.2	11.0	6.3	17.4
11.0	20.2	6.3	26.5	20.2	6.3	26.6	12.4	6.3	18.7
12.0	22.6	6.3	28.9	22.6	6.3	28.9	13.7	6.3	20.1
13.0	24.9	6.3	31.3	25.0	6.3	31.3	15.1	6.3	21.5
14.0	27.3	6.3	33.7	27.3	6.3	33.7	16.5	6.3	22.8
15.0	29.7	6.3	36.0	29.7	6.3	36.1	17.8	6.3	24.2
16.0	32.1	6.3	38.4	32.1	6.3	38.4	19.2	6.3	25.5
17.0	34.4	6.3	40.8	34.5	6.3	40.8	20.5	6.3	26.9
18.0	36.8	6.3	43.2	36.8	6.3	43.2	21.9	6.3	28.2
19.0	39.2	6.3	45.5	39.2	6.3	45.6	23.2	6.3	29.6
20.0	41.6	6.4	47.9	41.6	6.4	47.9	24.6	6.4	31.0
21.0	43.9	6.4	50.3	44.0	6.4	50.3	26.0	6.4	32.3
22.0	46.3	6.4	52.7	46.4	6.4	52.7	27.3	6.4	33.7
23.0	48.7	6.4	55.0	48.7	6.4	55.1	28.7	6.4	35.0
24.0	51.1	6.4	57.4	51.1	6.4	57.5	30.1	6.4	36.4
25.0	53.4	6.4	59.8	53.5	6.4	59.8	31.4	6.4	37.8
26.0	55.8	6.4	62.2	55.9	6.4	62.2	32.8	6.4	39.2
27.0	58.2	6.4	64.5	58.2	6.4	64.6	34.2	6.4	40.6
28.0	60.6	6.4	66.9	60.6	6.4	67.0	35.6	6.4	41.9
29.0	62.9	6.4	69.3	63.0	6.4	69.3	37.0	6.4	43.3
30.0	65.3	6.4	71.7	65.4	6.4	71.7	38.4	6.4	44.7
31.0	67.7	6.5	74.2	67.7	6.5	74.3	39.8	6.5	46.3
32.0	70.1	6.7	76.8	70.1	6.7	76.8	41.2	6.7	47.9
33.0	72.4	6.9	79.3	72.5	6.9	79.4	42.6	6.9	49.5
34.0	74.9	6.9	81.8	74.9	6.9	81.8	44.1	6.9	50.9
35.0	77.5	6.9	84.3	77.5	6.9	84.3	45.5	6.9	52.4
36.0	80.0	6.9	86.9	80.0	6.9	86.8	47.0	6.9	53.8
37.0	82.6	6.9	89.5	82.5	6.9	89.4	48.4	6.9	55.3

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38.0	85.2	6.9	92.0	85.0	6.9	91.9	49.9	6.9	56.8
39.0	87.7	6.9	94.6	87.5	6.9	94.4	51.4	6.9	58.2
40.0	90.3	6.9	97.1	90.0	6.9	96.9	52.9	6.9	59.7
41.0	92.9	6.9	99.7	92.6	6.9	99.4	54.3	6.9	61.2
42.0	95.4	6.9	102.3	95.1	6.9	101.9	55.8	6.9	62.7
43.0	98.0	6.9	104.8	97.6	6.9	104.4	57.3	6.9	64.2
44.0	100.5	6.9	107.4	100.1	6.9	107.0	58.8	6.9	65.6
45.0	103.1	8.3	111.4	102.6	8.3	110.9	60.3	8.3	68.5
46.0	105.7	61.4	167.1	105.1	61.4	166.5	61.8	61.4	123.2
47.0	108.2	114.5	222.8	107.7	114.5	222.2	63.3	114.5	177.8
48.0	110.8	167.6	278.4	110.2	167.6	277.8	64.8	167.6	232.4
49.0	121.4	167.6	289.0	127.1	167.6	294.8	81.7	167.6	249.4
50.0	139.9	168.0	307.9	158.5	168.0	326.5	100.7	168.0	268.7
51.0	158.5	181.9	340.3	189.9	181.9	371.7	119.7	181.9	301.6
52.0	177.0	195.7	372.7	221.2	195.7	417.0	138.8	195.7	334.5
53.0	195.6	209.6	405.1	252.6	209.6	462.2	157.9	209.6	367.4
54.0	216.4	209.6	426.0	287.9	209.6	497.5	181.4	209.6	391.0
55.0	239.6	209.5	449.2	327.1	209.5	536.7	205.0	209.5	414.5
56.0	262.8	209.5	472.4	366.4	209.5	575.9	228.6	209.5	438.2
57.0	286.0	209.5	495.5	405.6	209.5	615.1	252.3	209.5	461.8
58.0	309.2	209.5	518.7	444.8	209.5	654.4	275.9	209.5	485.5

\*\*\*\*\*  
 \* API RP-2A (1994) \*  
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PILE PENETRATI ON FT.	TOTAL SKI N FRI CTI ON KIP	END BEARI NG KIP	ULTI MATE CAPACI TY KIP
0.00	0.0	6.3	6.3
1.00	0.0	6.3	6.3
2.00	0.0	6.3	6.3
3.00	0.4	6.3	6.8
4.00	1.3	6.3	7.6
5.00	2.2	6.3	8.6
6.00	3.2	6.3	9.5
7.00	4.2	6.3	10.6
8.00	5.3	6.3	11.6
9.00	6.4	6.3	12.7
10.00	7.5	6.3	13.8
11.00	8.6	6.3	15.0
12.00	9.8	6.3	16.2
13.00	11.0	6.3	17.4
14.00	12.3	6.3	18.6
15.00	13.6	6.3	19.9
16.00	14.9	6.3	21.3
17.00	16.3	6.3	22.7
18.00	17.8	6.3	24.1
19.00	19.2	6.3	25.6
20.00	20.7	6.4	27.1
21.00	22.3	6.4	28.6
22.00	23.9	6.4	30.2
23.00	25.5	6.4	31.9
24.00	27.2	6.4	33.5
25.00	28.9	6.4	35.2
26.00	30.6	6.4	37.0
27.00	32.4	6.4	38.7
28.00	34.2	6.4	40.5
29.00	36.0	6.4	42.3
30.00	37.9	6.4	44.2
31.00	39.8	6.5	46.3

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32.00	41.7	6.7	48.4
33.00	43.6	6.9	50.5
34.00	45.7	6.9	52.5
35.00	47.7	6.9	54.6
36.00	49.9	6.9	56.7
37.00	52.0	6.9	58.9
38.00	54.2	6.9	61.1
39.00	56.4	6.9	63.3
40.00	58.7	6.9	65.5
41.00	61.0	6.9	67.8
42.00	63.3	6.9	70.1
43.00	65.6	6.9	72.5
44.00	68.0	6.9	74.8
45.00	70.4	8.3	78.6
46.00	72.8	61.4	134.2
47.00	75.2	114.5	189.7
48.00	77.7	167.6	245.3
49.00	88.8	167.6	256.5
50.00	108.7	168.0	276.7
51.00	128.7	181.9	310.5
52.00	148.8	195.7	344.5
53.00	169.1	209.6	378.6
54.00	191.3	209.6	400.9
55.00	215.6	209.5	425.1
56.00	240.0	209.5	449.5
57.00	264.5	209.5	474.1
58.00	289.2	209.5	498.8

AN ASTERISK WILL BE PLACED IN THE END-BEARING COLUMN IF THE TIP RESISTANCE IS CONTROLLED BY THE FRICTION OF SOIL PLUG INSIDE AN OPEN-ENDED PIPE PILE.

\*\*\*\*\*  
 \* COMPUTE LOAD-DISTRIBUTION AND LOAD-SETTLEMENT \*  
 \* CURVES FOR AXIAL LOADING \*  
 \*\*\*\*\*

T-Z CURVE NO.	NO. OF POINTS	DEPTH TO CURVE FT.	LOAD TRANSFER PSI	PILE MOVEMENT IN.
1	10	0.0000E+00	0.0000E+00	0.0000E+00
			0.0000E+00	0.2906E-01
			0.0000E+00	0.5629E-01
			0.0000E+00	0.1035E+00
			0.0000E+00	0.1453E+00
			0.0000E+00	0.1816E+00
			0.0000E+00	0.3632E+00
			0.0000E+00	0.5448E+00
			0.0000E+00	0.9080E+00
			0.0000E+00	0.3632E+01
2	10	0.1652E+02	0.0000E+00	0.0000E+00
			0.6102E+00	0.2906E-01
			0.1017E+01	0.5629E-01
			0.1525E+01	0.1035E+00
			0.1831E+01	0.1453E+00
			0.2034E+01	0.1816E+00
			0.1831E+01	0.3632E+00

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3	10	0. 3296E+02	0. 1831E+01	0. 5448E+00
			0. 1831E+01	0. 9080E+00
			0. 1831E+01	0. 3632E+01
			0. 0000E+00	0. 0000E+00
			0. 8564E+00	0. 2906E-01
			0. 1427E+01	0. 5629E-01
			0. 2141E+01	0. 1035E+00
			0. 2569E+01	0. 1453E+00
			0. 2855E+01	0. 1816E+00
			0. 2569E+01	0. 3632E+00
4	10	0. 3300E+02	0. 2569E+01	0. 5448E+00
			0. 2569E+01	0. 9080E+00
			0. 2569E+01	0. 3632E+01
			0. 0000E+00	0. 0000E+00
			0. 8870E+00	0. 2906E-01
			0. 1478E+01	0. 5629E-01
			0. 2218E+01	0. 1035E+00
			0. 2661E+01	0. 1453E+00
			0. 2957E+01	0. 1816E+00
			0. 2661E+01	0. 3632E+00
5	10	0. 4052E+02	0. 2661E+01	0. 5448E+00
			0. 2661E+01	0. 9080E+00
			0. 2661E+01	0. 3632E+01
			0. 0000E+00	0. 0000E+00
			0. 9980E+00	0. 2906E-01
			0. 1663E+01	0. 5629E-01
			0. 2495E+01	0. 1035E+00
			0. 2994E+01	0. 1453E+00
			0. 3327E+01	0. 1816E+00
			0. 2994E+01	0. 3632E+00
6	10	0. 4796E+02	0. 2994E+01	0. 5448E+00
			0. 2994E+01	0. 9080E+00
			0. 2994E+01	0. 3632E+01
			0. 0000E+00	0. 0000E+00
			0. 1084E+01	0. 2906E-01
			0. 1806E+01	0. 5629E-01
			0. 2710E+01	0. 1035E+00
			0. 3252E+01	0. 1453E+00
			0. 3613E+01	0. 1816E+00
			0. 3252E+01	0. 3632E+00
7	10	0. 4800E+02	0. 3252E+01	0. 5448E+00
			0. 3252E+01	0. 9080E+00
			0. 3252E+01	0. 3632E+01
			0. 0000E+00	0. 0000E+00
			0. 4880E+01	0. 2906E-01
			0. 8133E+01	0. 5629E-01
			0. 1220E+02	0. 1035E+00
			0. 1464E+02	0. 1453E+00
			0. 1627E+02	0. 1816E+00
			0. 1464E+02	0. 3632E+00
8	10	0. 5052E+02	0. 1464E+02	0. 5448E+00
			0. 1464E+02	0. 9080E+00
			0. 1464E+02	0. 3632E+01
			0. 0000E+00	0. 0000E+00
			0. 8761E+01	0. 2906E-01
			0. 1460E+02	0. 5629E-01
			0. 2190E+02	0. 1035E+00

FM\_Inlet\_Long\_HP14x89\_20150313\_893.apo

			0. 2628E+02	0. 1453E+00
			0. 2920E+02	0. 1816E+00
			0. 2628E+02	0. 3632E+00
			0. 2628E+02	0. 5448E+00
			0. 2628E+02	0. 9080E+00
			0. 2628E+02	0. 3632E+01
9	10	0. 5296E+02		
			0. 0000E+00	0. 0000E+00
			0. 8879E+01	0. 2906E-01
			0. 1480E+02	0. 5629E-01
			0. 2220E+02	0. 1035E+00
			0. 2664E+02	0. 1453E+00
			0. 2960E+02	0. 1816E+00
			0. 2664E+02	0. 3632E+00
			0. 2664E+02	0. 5448E+00
			0. 2664E+02	0. 9080E+00
			0. 2664E+02	0. 3632E+01
10	10	0. 5300E+02		
			0. 0000E+00	0. 0000E+00
			0. 9752E+01	0. 2906E-01
			0. 1625E+02	0. 5629E-01
			0. 2438E+02	0. 1035E+00
			0. 2926E+02	0. 1453E+00
			0. 3251E+02	0. 1816E+00
			0. 2926E+02	0. 3632E+00
			0. 2926E+02	0. 5448E+00
			0. 2926E+02	0. 9080E+00
			0. 2926E+02	0. 3632E+01
11	10	0. 5902E+02		
			0. 0000E+00	0. 0000E+00
			0. 1082E+02	0. 2906E-01
			0. 1804E+02	0. 5629E-01
			0. 2705E+02	0. 1035E+00
			0. 3246E+02	0. 1453E+00
			0. 3607E+02	0. 1816E+00
			0. 3246E+02	0. 3632E+00
			0. 3246E+02	0. 5448E+00
			0. 3246E+02	0. 9080E+00
			0. 3246E+02	0. 3632E+01
12	10	0. 6496E+02		
			0. 0000E+00	0. 0000E+00
			0. 1082E+02	0. 2906E-01
			0. 1804E+02	0. 5629E-01
			0. 2705E+02	0. 1035E+00
			0. 3246E+02	0. 1453E+00
			0. 3607E+02	0. 1816E+00
			0. 3246E+02	0. 3632E+00
			0. 3246E+02	0. 5448E+00
			0. 3246E+02	0. 9080E+00
			0. 3246E+02	0. 3632E+01

TIP LOAD  
KIP

0. 0000E+00  
0. 1310E+02  
0. 2619E+02  
0. 5239E+02  
0. 1048E+03  
0. 1572E+03  
0. 1886E+03

TIP MOVEMENT  
IN.

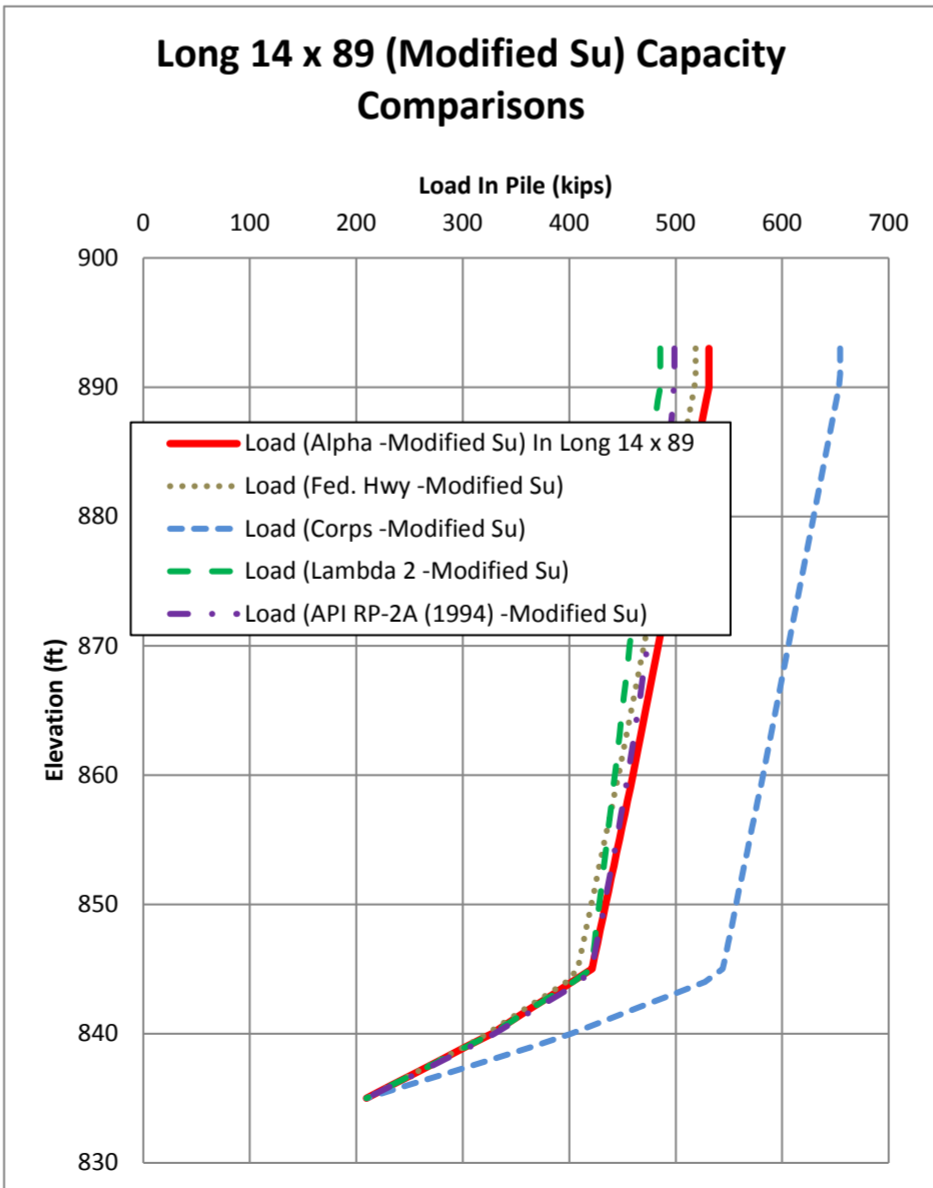
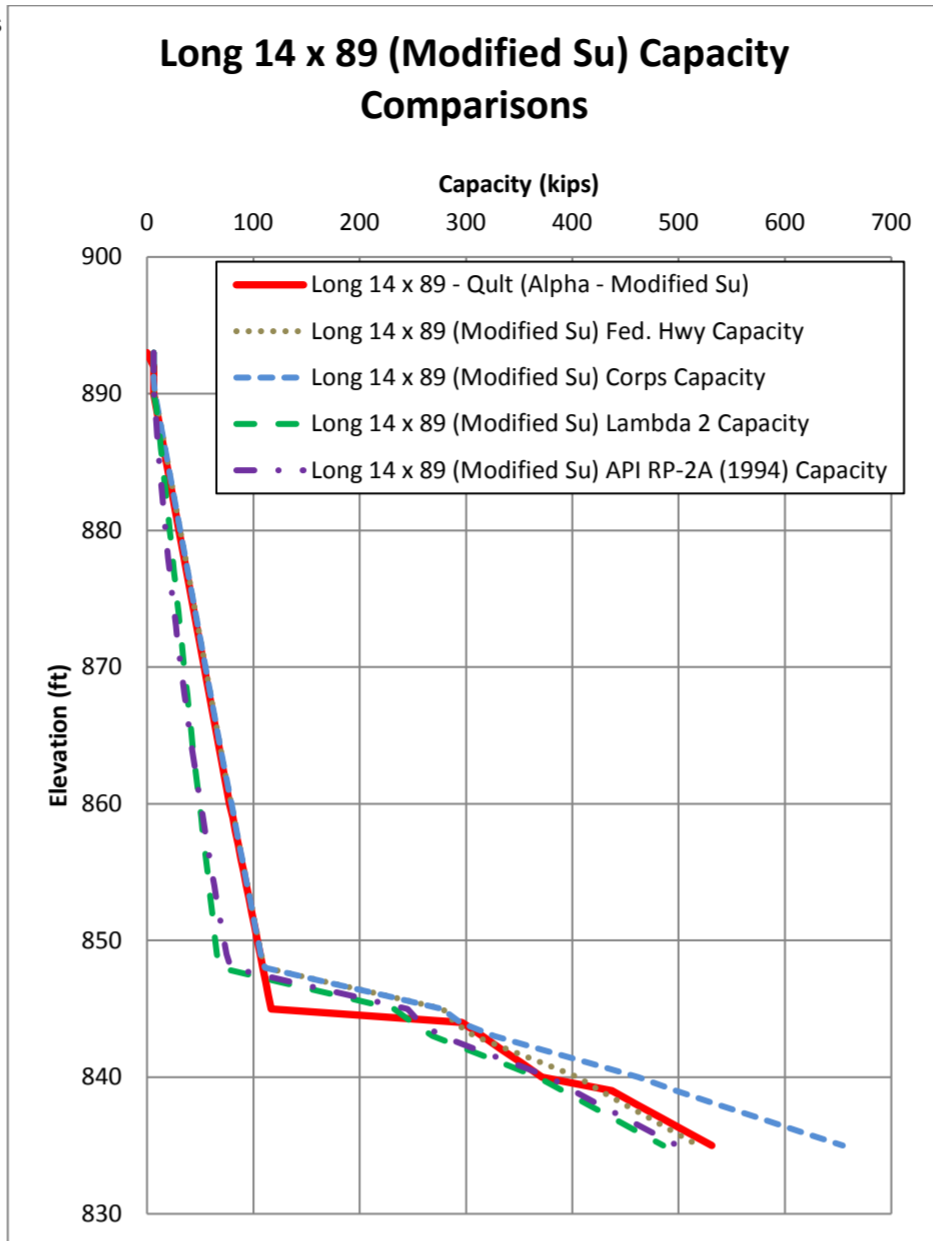
0. 0000E+00  
0. 9080E-02  
0. 1816E-01  
0. 3632E-01  
0. 2361E+00  
0. 7627E+00  
0. 1326E+01

0. 2095E+03	FM_Inlet_Long_HP14x89_20150313_893. apo
0. 2095E+03	0. 1816E+01
0. 2095E+03	0. 2724E+01
	0. 3632E+01

LOAD VERSUS SETTLEMENT CURVE  
 \*\*\*\*\*

TOP LOAD KIP	TOP MOVEMENT IN.	TIP LOAD KIP	TIP MOVEMENT IN.
0. 4484E+00	0. 1457E-03	0. 1442E+00	0. 1000E-03
0. 4484E+01	0. 1457E-02	0. 1442E+01	0. 1000E-02
0. 2242E+02	0. 7285E-02	0. 7212E+01	0. 5000E-02
0. 4484E+02	0. 1457E-01	0. 1442E+02	0. 1000E-01
0. 1868E+03	0. 6905E-01	0. 5598E+02	0. 5000E-01
0. 2764E+03	0. 1280E+00	0. 6909E+02	0. 1000E+00
0. 3804E+03	0. 5395E+00	0. 1310E+03	0. 5000E+00
0. 4197E+03	0. 1044E+01	0. 1704E+03	0. 1000E+01
0. 4589E+03	0. 2049E+01	0. 2095E+03	0. 2000E+01

Method		Fed. Hwy			Corps			Lambda 2			API RP-2A (1994)		
Elev.	Pile Penetration	Long 14 x 89 (Modified Su) Fed. Hwy Skin	Long 14 x 89 (Modified Su) Fed. Hwy Bearing	Long 14 x 89 (Modified Su) Fed. Hwy Capacity	Long 14 x 89 (Modified Su) Corps Skin	Long 14 x 89 (Modified Su) Corps Bearing	Long 14 x 89 (Modified Su) Corps Capacity	Long 14 x 89 (Modified Su) Lambda 2 Skin	Long 14 x 89 (Modified Su) Lambda 2 Bearing	Long 14 x 89 (Modified Su) Lambda 2 Capacity	Long 14 x 89 (Modified Su) API RP 2A (1994) Skin	Long 14 x 89 (Modified Su) API RP 2A (1994) Bearing	Long 14 x 89 (Modified Su) API RP 2A (1994) Capacity
ft	ft	kip	kip	kip	kip	kip	kip	kip	kip	kip	kip	kip	kip
Max Value		309.2	209.6	518.7	444.8	209.6	654.4	275.9	209.6	485.5	289.2	209.6	498.8
893	0	0	6	6	0	6	6	0	6	6	0	6	6
892	1	0	6	6	0	6	6	0	6	6	0	6	6
891	2	0	6	6	0	6	6	0	6	6	0	6	6
890	3	1	6	8	1	6	8	0	6	6	0	6	7
889	4	4	6	10	4	6	10	2	6	9	1	6	8
888	5	6	6	12	6	6	12	4	6	10	2	6	9
887	6	8	6	15	8	6	15	5	6	12	3	6	10
886	7	11	6	17	11	6	17	7	6	13	4	6	11
885	8	13	6	19	13	6	19	8	6	15	5	6	12
884	9	15	6	22	16	6	22	10	6	16	6	6	13
883	10	18	6	24	18	6	24	11	6	17	8	6	14
882	11	20	6	27	20	6	27	12	6	19	9	6	15
881	12	23	6	29	23	6	29	14	6	20	10	6	16
880	13	25	6	31	25	6	31	15	6	22	11	6	17
879	14	27	6	34	27	6	34	17	6	23	12	6	19
878	15	30	6	36	30	6	36	18	6	24	14	6	20
877	16	32	6	38	32	6	38	19	6	26	15	6	21
876	17	34	6	41	35	6	41	21	6	27	16	6	23
875	18	37	6	43	37	6	43	22	6	28	18	6	24
874	19	39	6	46	39	6	46	23	6	30	19	6	26
873	20	42	6	48	42	6	48	25	6	31	21	6	27
872	21	44	6	50	44	6	50	26	6	32	22	6	29
871	22	46	6	53	46	6	53	27	6	34	24	6	30
870	23	49	6	55	49	6	55	29	6	35	26	6	32
869	24	51	6	57	51	6	58	30	6	36	27	6	34
868	25	53	6	60	54	6	60	31	6	38	29	6	35
867	26	56	6	62	56	6	62	33	6	39	31	6	37
866	27	58	6	65	58	6	65	34	6	41	32	6	39
865	28	61	6	67	61	6	67	36	6	42	34	6	41
864	29	63	6	69	63	6	69	37	6	43	36	6	42
863	30	65	6	72	65	6	72	38	6	45	38	6	44
862	31	68	7	74	68	7	74	40	7	46	40	7	46
861	32	70	7	77	70	7	77	41	7	48	42	7	48
860	33	72	7	79	73	7	79	43	7	50	44	7	51
859	34	75	7	82	75	7	82	44	7	51	46	7	53
858	35	78	7	84	78	7	84	46	7	52	48	7	55
857	36	80	7	87	80	7	87	47	7	54	50	7	57
856	37	83	7	90	83	7	89	48	7	55	52	7	59
855	38	85	7	92	85	7	92	50	7	57	54	7	61
854	39	88	7	95	88	7	94	51	7	58	56	7	63
853	40	90	7	97	90	7	97	53	7	60	59	7	66
852	41	93	7	100	93	7	99	54	7	61	61	7	68
851	42	95	7	102	95	7	102	56	7	63	63	7	70
850	43	98	7	105	98	7	104	57	7	64	66	7	73
849	44	101	7	107	100	7	107	59	7	66	68	7	75
848	45	103	8	111	103	8	111	60	8	69	70	8	79
847	46	106	61	167	105	61	167	62	61	123	73	61	134
846	47	108	115	223	108	115	222	63	115	178	75	115	190
845	48	111	168	278	110	168	278	65	168	232	78	168	245
844	49	121	168	289	127	168	295	82	168	249	89	168	257
843	50	140	168	308	159	168	327	101	168	269	109	168	277
842	51	159	182	340	190	182	372	120	182	302	129	182	311
841	52	177	196	373	221	196	417	139	196	335	149	196	345
840	53	196	210	405	253	210	462	158	210	367	169	210	379
839	54	216	210	426	288	210	498	181	210	391	191	210	401
838	55	240	210	449	327	210	537	205	210	415	216	210	425
837	56	263	210	472	366	210	576	229	210	438	240	210	450
836	57	286	210	496	406	210	615	252	210	462	265	210	474
835	58	309	210	519	445	210	654	276	210	486	289	210	499



### Load In Pile

Load (Fed. Hwy - Modified Su)	Load (Corps - Modified Su)	Load (Lambda 2 - Modified Su)	Load (API RP-2A (1994) - Modified Su)
519	654	486	499
519	654	486	499
519	654	486	499
518	653	486	498
515	651	483	498
513	649	482	497
510	646	480	496
508	644	479	495
506	641	477	494
503	639	476	492
501	637	475	491
499	634	473	490
496	632	472	489
494	629	470	488
491	627	469	487
489	625	468	485
487	622	466	484
484	620	465	483
482	618	464	481
480	615	462	480
477	613	461	478
475	610	460	477
472	608	458	475
470	606	457	473
468	603	455	472
465	601	454	470
463	599	453	468
461	596	451	466
458	594	450	465
456	591	449	463
453	589	447	461
451	587	446	459
449	584	444	457
446	582	443	455
444	580	441	453
441	577	440	451
439	574	439	449
436	572	437	447
434	569	436	445
431	567	434	442
428	564	433	440
426	562	431	438
423	559	430	436
421	557	428	433
418	554	427	431
416	552	425	428
413	549	424	426
411	547	422	424
408	544	421	421
397	527	404	410
379	496	385	390
360	465	366	370
342	433	347	350
323	402	328	330
302	367	304	308
279	327	281	283
256	288	257	259
233	249	233	234
210	210	210	210

## **Example Calculations:**

- (1) Pile Capacity Excel Spreadsheet for Alpha and Beta Method for Pile at Elevation 893



Project: FMM Inlet

Subject: Information for Inlet Structure

Computed By: LLA

Revised By:

Reviewed By:

Worksheet Development Started By:

Date: 2/9/2016

Date Revised:

Date Reviewed:

Kurt Heckendorf

4/16/2014

Revisions made by:

Kurt Heckendorf

4/18/2014

**Section Information**

Location: Inlet Structure

**Groundwater Information**

Vertical Datum: NAVD 88

Depth to Groundwater Table: 0 ft

Groundwater Table Elevation: 893 ft

**Site Information**

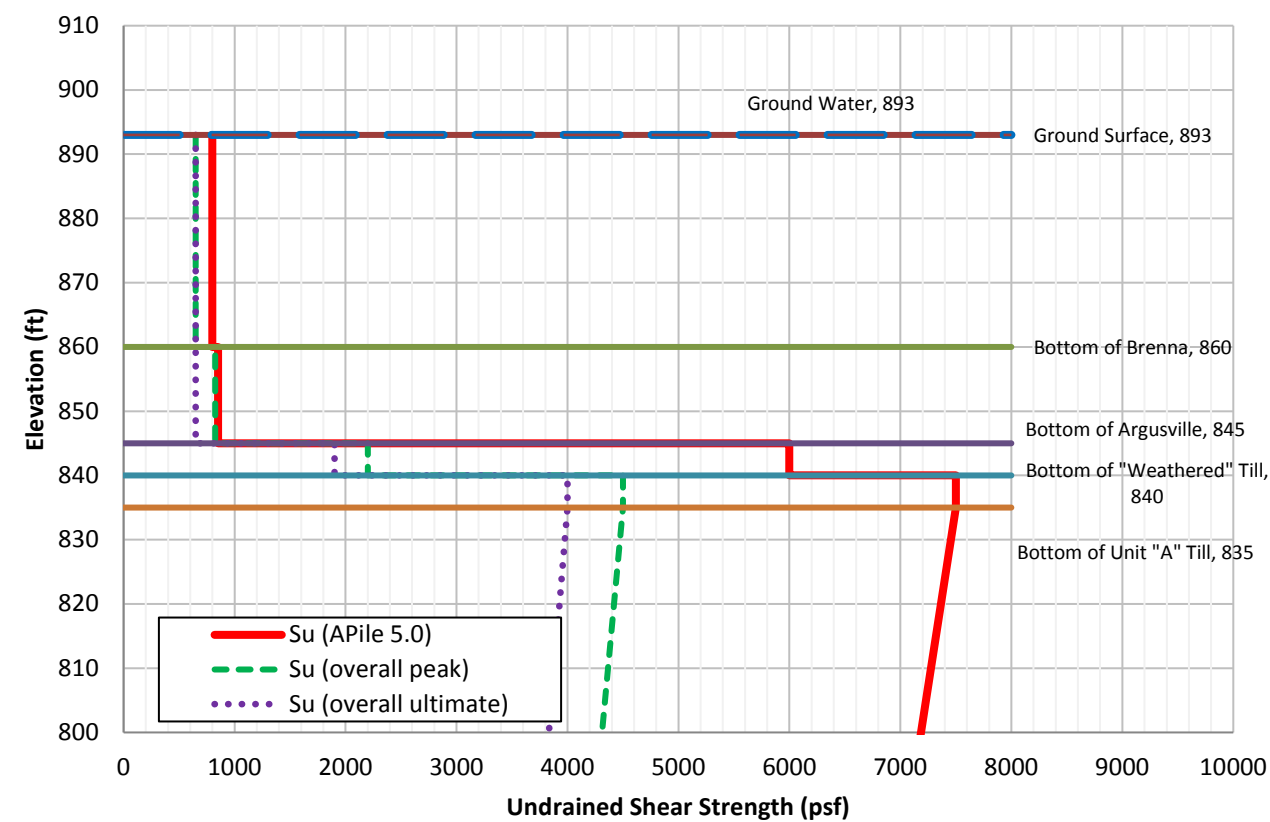
Existing Ground Surface Elevation: 893 ft

**Stratigraphy Information of Inlet Structure**

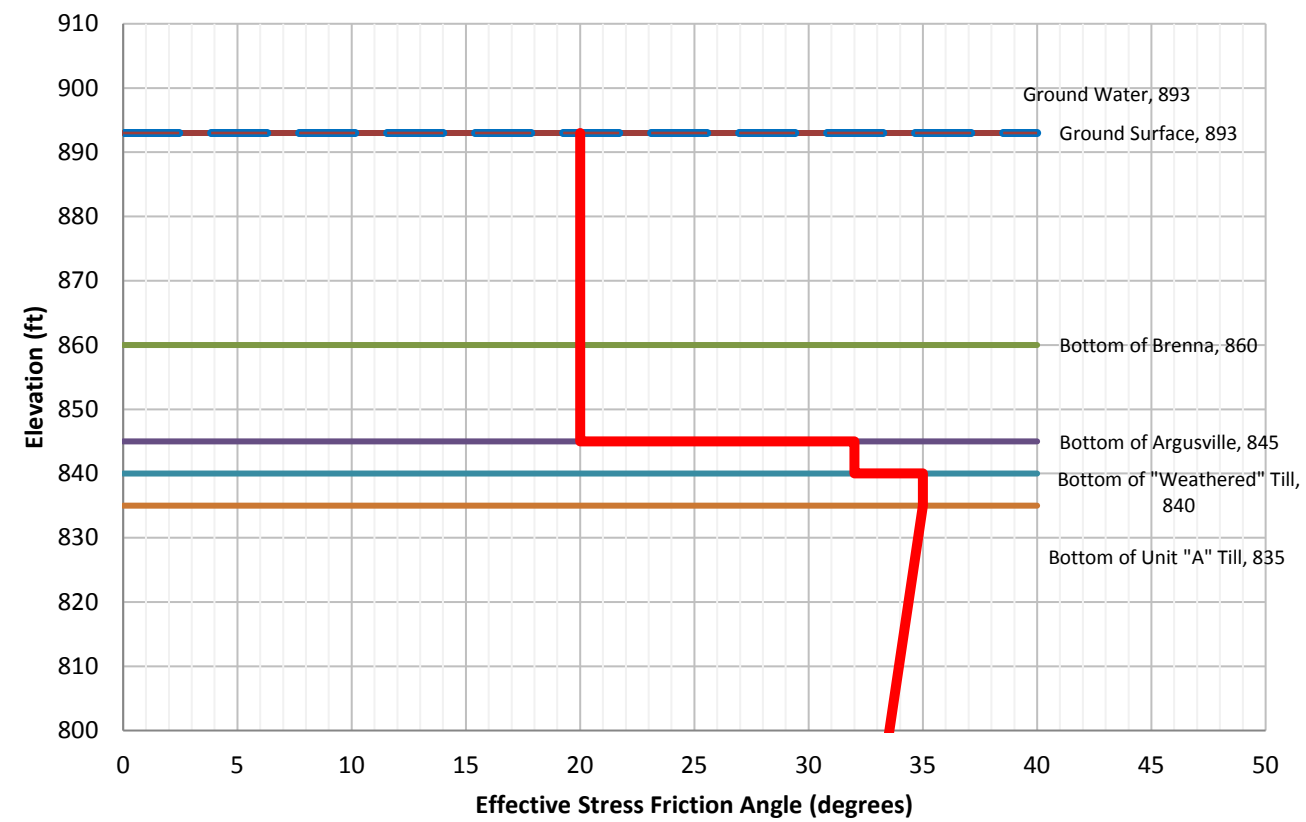
**Material Properties - Mean**

Layer	Formation	Top Elevation	Bottom Elevation	Thickness (ft)	$\gamma_{sat}$ (pcf)	$S_u$ (APile 5.0)	$S_u$ (overall peak) (psf)	$S_u$ (overall ultimate) (psf)	$\phi'$ (APile 5.0) (degree)	Soil Type	$S_u$ (peak) (kPa)	$S_u$ Strength Factor	Modified $S_u$	Modified $\phi'$
1	Brenna	893	860	33	106	800	650	650	20	Clay	38	0.63	500	20
2	Argusville	860	845	15	110	850	825	650	20	Clay	41	0.63	540	22
3	"Weathered" Till	845	840	5	123	6000	2200	1900	32	Gravel	287	2.20	13,200	32
4	Unit "A" Till	840	835	5	123	7500	4500	4000	35	Gravel	359	2.20	16,500	37

**Undrained Shear Strength and Stratigraphy Profile**



**Effective Stress Shear Strength and Stratigraphy Profile**



Project: FMM Inlet  
 Subject: Alpha Method for Long 14 x 73 - (Modified Su)  
 Method Alpha  
 Strength Modified Su  
 Computed By: LLS Revised By: Reviewed By:  
 Date: 4/9/2015 Date Revised: Date Reviewed:

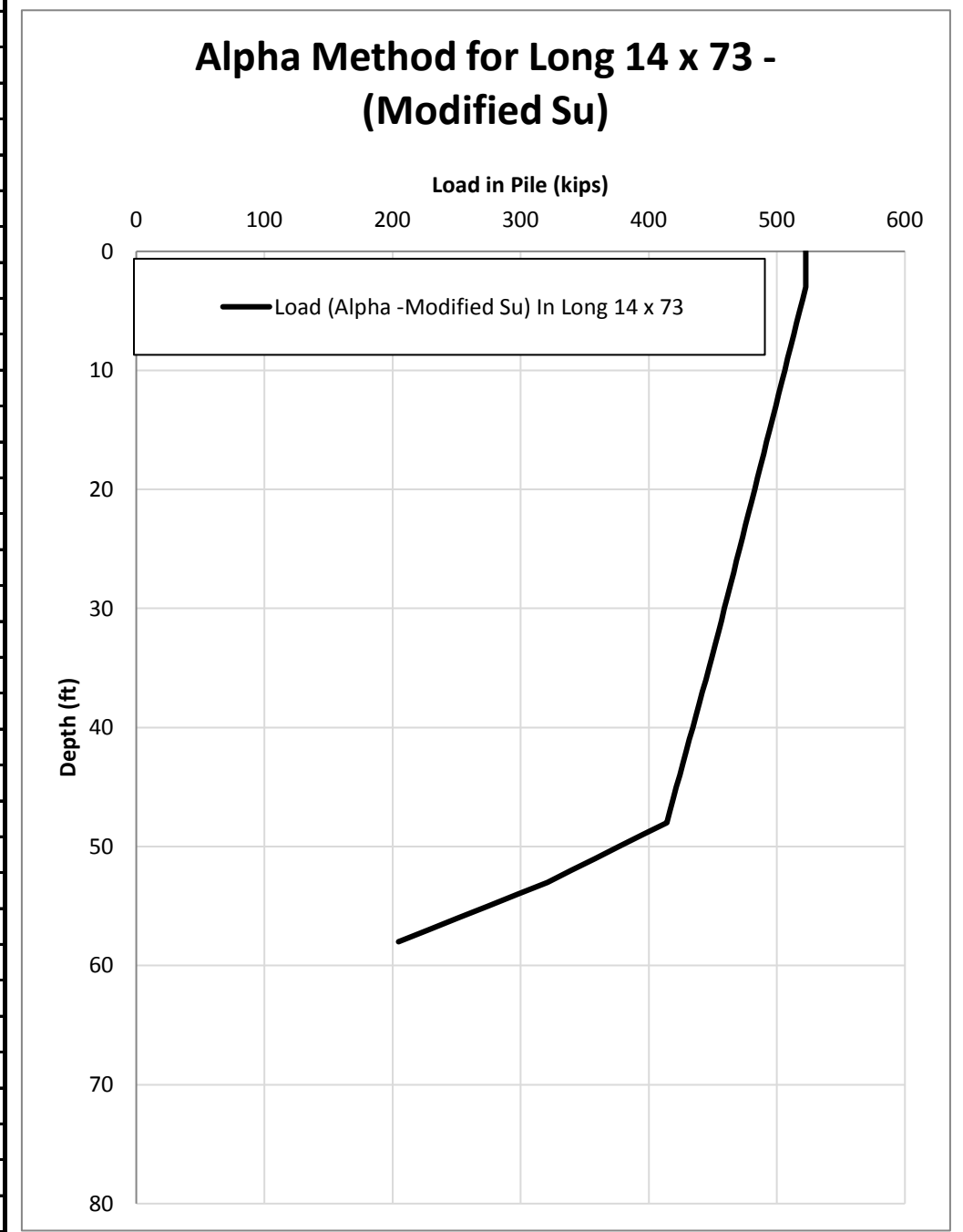
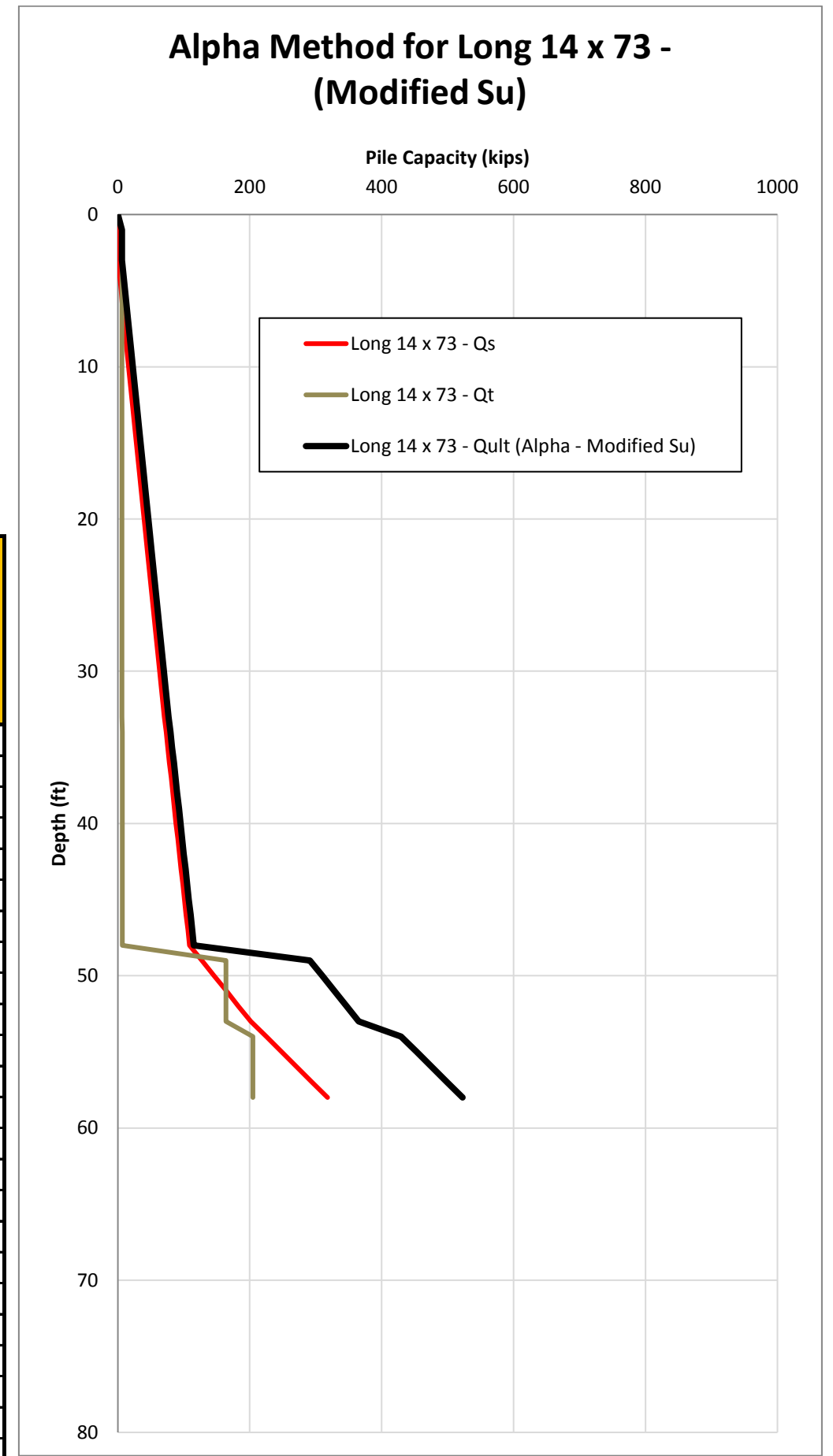
**Pile Information**

Pile Number Long 14 x 73 Pile Weight 73 lbs per ft  
 Type of Pile HP Zero Skin Friction Depth 3 ft  
 Size HP 14 x 73 Tip Coefficient 9 Skin 318 kips  
 Pile Length 58 ft Tip 205 kips  
 Pile Diameter 14 in D/b 49.7  
 Box Perimeter 56.39 in 4.70 ft  
 Tip Area 1.38 sq ft 199 sq in  
 Cross Sectional Area 21.4 sq in  
 Modulus of Elasticity 29,000,000 psi  
 Pile Tip Elevation 835 ft

**Ultimate Capacity**

522604 lbs  
**261 tons**  
 523 kips

Depth (ft)	Elev. (ft)	Formation	Modified Su		Su (PEAK)		Su (design)	$\alpha$	C <sub>s</sub>	q <sub>s</sub>	Long 14 x 73 - Qs		Long 14 x 73 - Qt		Long 14 x 73 - Qult (Alpha - Modified Su)		Load (Alpha - Modified Su) In Long 14 x 73
			(psf)	(kpa)	(psf)	(kpa)					lbs	kips	lbs	kips	lbs	kips	
0	893	Brenna									0	0	0	0	0	0	523
1	892	Brenna	500	24	38.3	2	500	1.000	500	0	0	0	6203	6	6203	6	523
2	891	Brenna	500	24	38.3	2	500	1.000	500	0	0	0	6203	6	6203	6	523
3	890	Brenna	500	24	38.3	2	500	1.000	500	0	0	0	6203	6	6203	6	523
4	889	Brenna	500	24	38.3	2	500	1.000	500	2350	2350	2	6203	6	8553	9	520
5	888	Brenna	500	24	38.3	2	500	1.000	500	2350	4699	5	6203	6	10902	11	518
6	887	Brenna	500	24	38.3	2	500	1.000	500	2350	7049	7	6203	6	13252	13	516
7	886	Brenna	500	24	38.3	2	500	1.000	500	2350	9398	9	6203	6	15602	16	513
8	885	Brenna	500	24	38.3	2	500	1.000	500	2350	11748	12	6203	6	17951	18	511
9	884	Brenna	500	24	38.3	2	500	1.000	500	2350	14098	14	6203	6	20301	20	509
10	883	Brenna	500	24	38.3	2	500	1.000	500	2350	16447	16	6203	6	22650	23	506
11	882	Brenna	500	24	38.3	2	500	1.000	500	2350	18797	19	6203	6	25000	25	504
12	881	Brenna	500	24	38.3	2	500	1.000	500	2350	21146	21	6203	6	27349	27	501
13	880	Brenna	500	24	38.3	2	500	1.000	500	2350	23496	23	6203	6	29699	30	499
14	879	Brenna	500	24	38.3	2	500	1.000	500	2350	25845	26	6203	6	32049	32	497
15	878	Brenna	500	24	38.3	2	500	1.000	500	2350	28195	28	6203	6	34398	34	494
16	877	Brenna	500	24	38.3	2	500	1.000	500	2350	30545	31	6203	6	36748	37	492
17	876	Brenna	500	24	38.3	2	500	1.000	500	2350	32894	33	6203	6	39097	39	490
18	875	Brenna	500	24	38.3	2	500	1.000	500	2350	35244	35	6203	6	41447	41	487
19	874	Brenna	500	24	38.3	2	500	1.000	500	2350	37593	38	6203	6	43797	44	485
20	873	Brenna	500	24	38.3	2	500	1.000	500	2350	39943	40	6203	6	46146	46	483
21	872	Brenna	500	24	38.3	2	500	1.000	500	2350	42293	42	6203	6	48496	48	480
22	871	Brenna	500	24	38.3	2	500	1.000	500	2350	44642	45	6203	6	50845	51	478
23	870	Brenna	500	24	38.3	2	500	1.000	500	2350	46992	47	6203	6	53195	53	476
24	869	Brenna	500	24	38.3	2	500	1.000	500	2350	49341	49	6203	6	55544	56	473
25	868	Brenna	500	24	38.3	2	500	1.000	500	2350	51691	52	6203	6	57894	58	471
26	867	Brenna	500	24	38.3	2	500	1.000	500	2350	54040	54	6203	6	60244	60	469
27	866	Brenna	500	24	38.3	2	500	1.000	500	2350	56390	56	6203	6	62593	63	466
28	865	Brenna	500	24	38.3	2	500	1.000	500	2350	58740	59	6203	6	64943	65	464
29	864	Brenna	500	24	38.3	2	500	1.000	500	2350	61089	61	6203	6	67292	67	462
30	863	Brenna	500	24	38.3	2	500	1.000	500	2350	63439	63	6203	6	69642	70	459
31	862	Brenna	500	24	38.3	2	500	1.000	500	2350	65788	66	6203	6	71992	72	457
32	861	Brenna	500	24	38.3	2	500	1.000	500	2350	68138	68	6203	6	74341	74	454
33	860	Brenna	500	24	38.3	2	500	1.000	500	2350	70488	70	6203	6	76691	77	452
34	859	Argusville	540	26	40.7	2	540	1.000	540	2538	73025	73	6699	7	79724	80	450
35	858	Argusville	540	26	40.7	2	540	1.000	540	2538	75563	76	6699	7	82262	82	447
36	857	Argusville	540	26	40.7	2	540	1.000	540	2538	78100	78	6699	7	84800	85	445
37	856	Argusville	540	26	40.7	2	540	1.000	540	2538	80638	81	6699	7	87337	87	442
38	855	Argusville	540	26	40.7	2	540	1.000	540	2538	83175	83	6699	7	89875	90	439
39	854	Argusville	540	26	40.7	2	540	1.000	540	2538	85713	86	6699	7	92412	92	437
40	853	Argusville	540	26	40.7	2	540	1.000	540	2538	88250	88	6699	7	94950	95	434
41	852	Argusville	540	26	40.7	2	540	1.000	540	2538	90788	91	6699	7	97487	97	432
42	851	Argusville	540	26	40.7	2	540	1.000	540	2538	93325	93	6699	7	100025	100	429
43	850	Argusville	540	26	40.7	2	540	1.000	540	2538	95863	96	6699	7	102562	103	427
44	849	Argusville	540	26	40.7	2	540	1.000	540	2538	98401	98	6699	7	105100	105	424
45	848	Argusville	540	26	40.7	2	540	1.000	540	2538	100938	101	6699	7	107638	108	422
46	847	Argusville	540	26	40.7	2	540	1.000	540	2538	103476	103	6699	7	110175	110	419
47	846	Argusville	540	26	40.7	2	540	1.000	540	2538	106013	106	6699	7	112713	113	417
48	845	Argusville	540	26	40.7	2	540	1.000	540	2538	108551	109	6699	7	115250	115	414
49	844	Weathered" T	13200	632	287	14	13200	0.300	3960	18609	127159	127	163764	164	290923	291	395
50	843	Weathered" T	13200	632	287	14	13200	0.300	3960	18609	145768	146	163764	164	309532	310	377
51	842	Weathered" T	13200	632	287	14	13200	0.300	3960	18609	164377	164	163764	164	328141	328	358
52	841	Weathered" T	13200	632	287	14	13200	0.300	3960	18609	182986	183	163764	164	346750	347	340
53	840	Weathered" T	13200	632	287	14	13200	0.300	3960	18609	201594	202	163764	164	365358	365	321
54	839	Unit "A" Till	16500	790	359	17	16500	0.300	4950	23261	224855	225	204705	205	429560	430	298
55	838	Unit "A" Till	16500	790	359	17	16500	0.300	4950	23261	248116	248	204705	205	452821	453	274
56	837	Unit "A" Till	16500	790	359	17	16500	0.300	4950	23261	271377	271	204705	205	476082	476	251
57	836	Unit "A" Till	16500	790	359	17	16500	0.300	4950	23261	294638	295	204705	205	499343	499	228
58	835	Unit "A" Till	16500	790	359	17	16500	0.300	4950	23261	317899	318	204705	205	522604	523	205



Project: FMM Inlet  
 Subject: Beta Method for Long 14 x 73 - (Modified f)  
 Computed By: LLS Revised By: [Redacted] Reviewed By: [Redacted]  
 Date: 4/9/2015 Date Revised: [Redacted] Date Reviewed: [Redacted]

Method Beta  
 Strength Modified f'

**Pile Information**

Pile Number Long 14 x 73 Pile Weight 73 lbs per ft  
 Type of Pile HP Zero Skin Friction Depth 3 ft  
 Size HP 14 x 73  
 Pile Length 58 ft  
 Pile Diameter 14 in D/b 49.7  
 Perimeter 56.39 in 4.70 ft  
 Tip Area 1.38 sq ft 198.5 sq in  
 Cross Sectional Area 21.4 sq in  
 Modulus of Elasticity 29,000,000 psi  
 Pile Tip Elevation 835 ft

Skin 76 kips  
 Tip 315 kips

**Ultimate Capacity**

390427 lbs  
 195 tons  
 390 kips

Depth (ft)	Elev. (ft)	Formation	σ <sub>vo</sub> (psf)	Soil Type	Slope	"β <sub>o</sub> "	"φ <sub>o</sub> "	β	f <sub>s</sub>	q <sub>t</sub>	Slope	"N <sub>10</sub> "	"φ <sub>o</sub> "	N <sub>t</sub>	q <sub>t</sub>	Long 14 x 73 - Qs		Long 14 x 73 - Qt		Long 14 x 73 - Qult (Beta - Modified f')		Load (Beta - Modified f') In Long 14	
																lbs	kips	lbs	kips	lbs	kips		kips
0	893	Brenna	0	20	Clay	0.048	0.23	25	0.132	0	0	0.20	3	25	0.300	0	0	0	0	0	0	390	
1	892	Brenna	43.6	20	Clay	0.048	0.23	25	0.132	0	0	0.20	3	25	0.300	13.08	0	0	18	0	18	0	390
2	891	Brenna	87.2	20	Clay	0.048	0.23	25	0.132	0	0	0.20	3	25	0.300	26.16	0	0	36	0	36	0	390
3	890	Brenna	130.8	20	Clay	0.048	0.23	25	0.132	0	0	0.20	3	25	0.300	39.24	0	0.0	54	0	54	0	390
4	889	Brenna	174.4	20	Clay	0.048	0.23	25	0.132	20.181	95	0.20	3	25	0.300	52.32	95	0.1	72	0	167	0	390
5	888	Brenna	218	20	Clay	0.048	0.23	25	0.132	25.947	122	0.20	3	25	0.300	65.4	217	0.2	90	0	307	0	390
6	887	Brenna	261.6	20	Clay	0.048	0.23	25	0.132	31.714	149	0.20	3	25	0.300	78.48	366	0.4	108	0	474	0	390
7	886	Brenna	305.2	20	Clay	0.048	0.23	25	0.132	37.48	176	0.20	3	25	0.300	91.56	542	0.5	126	0	668	1	390
8	885	Brenna	348.8	20	Clay	0.048	0.23	25	0.132	43.246	203	0.20	3	25	0.300	104.64	745	0.7	144	0	889	1	390
9	884	Brenna	392.4	20	Clay	0.048	0.23	25	0.132	49.012	230	0.20	3	25	0.300	117.72	975	1	162	0	1138	1	389
10	883	Brenna	436	20	Clay	0.048	0.23	25	0.132	54.778	257	0.20	3	25	0.300	130.8	1233	1	180	0	1413	1	389
11	882	Brenna	479.6	20	Clay	0.048	0.23	25	0.132	60.544	285	0.20	3	25	0.300	143.88	1517	2	198	0	1716	2	389
12	881	Brenna	523.2	20	Clay	0.048	0.23	25	0.132	66.31	312	0.20	3	25	0.300	156.96	1829	2	216	0	2045	2	389
13	880	Brenna	566.8	20	Clay	0.048	0.23	25	0.132	72.076	339	0.20	3	25	0.300	170.04	2168	2	234	0	2402	2	388
14	879	Brenna	610.4	20	Clay	0.048	0.23	25	0.132	77.842	366	0.20	3	25	0.300	183.12	2533	3	252	0	2786	3	388
15	878	Brenna	654	20	Clay	0.048	0.23	25	0.132	83.608	393	0.20	3	25	0.300	196.2	2926	3	270	0	3197	3	388
16	877	Brenna	697.6	20	Clay	0.048	0.23	25	0.132	89.375	420	0.20	3	25	0.300	209.28	3346	3	288	0	3635	4	387
17	876	Brenna	741.2	20	Clay	0.048	0.23	25	0.132	95.141	447	0.20	3	25	0.300	222.36	3793	4	307	0	4100	4	387
18	875	Brenna	784.8	20	Clay	0.048	0.23	25	0.132	100.91	474	0.20	3	25	0.300	235.44	4268	4	325	0	4592	5	386
19	874	Brenna	828.4	20	Clay	0.048	0.23	25	0.132	106.67	501	0.20	3	25	0.300	248.52	4769	5	343	0	5111	5	386
20	873	Brenna	872	20	Clay	0.048	0.23	25	0.132	112.44	528	0.20	3	25	0.300	261.6	5297	5	361	0	5658	6	385
21	872	Brenna	915.6	20	Clay	0.048	0.23	25	0.132	118.21	555	0.20	3	25	0.300	274.68	5853	6	379	0	6231	6	385
22	871	Brenna	959.2	20	Clay	0.048	0.23	25	0.132	123.97	583	0.20	3	25	0.300	287.76	6435	6	397	0	6832	7	384
23	870	Brenna	1002.8	20	Clay	0.048	0.23	25	0.132	129.74	610	0.20	3	25	0.300	300.84	7045	7	415	0	7460	7	383
24	869	Brenna	1046.4	20	Clay	0.048	0.23	25	0.132	135.5	637	0.20	3	25	0.300	313.92	7682	8	433	0	8114	8	383
25	868	Brenna	1090	20	Clay	0.048	0.23	25	0.132	141.27	664	0.20	3	25	0.300	327	8346	8	451	0	8796	9	382
26	867	Brenna	1133.6	20	Clay	0.048	0.23	25	0.132	147.04	691	0.20	3	25	0.300	340.08	9036	9	469	0	9505	10	381
27	866	Brenna	1177.2	20	Clay	0.048	0.23	25	0.132	152.8	718	0.20	3	25	0.300	353.16	9755	10	487	0	10241	10	381
28	865	Brenna	1220.8	20	Clay	0.048	0.23	25	0.132	158.57	745	0.20	3	25	0.300	366.24	10500	10	505	1	11005	11	380
29	864	Brenna	1264.4	20	Clay	0.048	0.23	25	0.132	164.33	772	0.20	3	25	0.300	379.32	11272	11	523	1	11795	12	379
30	863	Brenna	1308	20	Clay	0.048	0.23	25	0.132	170.1	799	0.20	3	25	0.300	392.4	12071	12	541	1	12612	13	378
31	862	Brenna	1351.6	20	Clay	0.048	0.23	25	0.132	175.87	826	0.20	3	25	0.300	405.48	12898	13	559	1	13457	13	377
32	861	Brenna	1395.2	20	Clay	0.048	0.23	25	0.132	181.63	854	0.20	3	25	0.300	418.56	13751	14	577	1	14328	14	377
33	860	Brenna	1438.8	20	Clay	0.048	0.23	25	0.132	187.4	881	0.20	3	25	0.300	431.64	14632	15	595	1	15227	15	376
34	859	Argusville	1486.4	22	Clay	0.048	0.23	25	0.165	241.35	1134	0.20	3	25	0.754	1120.1	15766	16	1544	2	17310	17	375
35	858	Argusville	1534	22	Clay	0.048	0.23	25	0.165	249.21	1171	0.20	3	25	0.754	1155.97	16937	17	1593	2	18530	19	373
36	857	Argusville	1581.6	22	Clay	0.048	0.23	25	0.165	257.06	1208	0.20	3	25	0.754	1191.84	18145	18	1643	2	19788	20	372
37	856	Argusville	1629.2	22	Clay	0.048	0.23	25	0.165	264.92	1245	0.20	3	25	0.754	1227.71	19390	19	1692	2	21082	21	371
38	855	Argusville	1676.8	22	Clay	0.048	0.23	25	0.165	272.77	1282	0.20	3	25	0.754	1263.58	20672	21	1742	2	22414	22	370
39	854	Argusville	1724.4	22	Clay	0.048	0.23	25	0.165	280.63	1319	0.20	3	25	0.754	1299.45	21990	22	1791	2	23782	24	368
40	853	Argusville	1772	22	Clay	0.048	0.23	25	0.165	288.48	1356	0.20	3	25	0.754	1335.32	23346	23	1841	2	25187	25	367
41	852	Argusville	1819.6	22	Clay	0.048	0.23	25	0.165	296.34	1393	0.20	3	25	0.754	1371.19	24739	25	1890	2	26629	27	366
42	851	Argusville	1867.2	22	Clay	0.048	0.23	25	0.165	304.19	1429	0.20	3	25	0.754	1407.06	26168	26	1940	2	28108	28	364
43	850	Argusville	1914.8	22	Clay	0.048	0.23	25	0.165	312.05	1466	0.20	3	25	0.754	1442.93	27634	28	1989	2	29623	30	363
44	849	Argusville	1962.4	22	Clay	0.048	0.23	25	0.165	319.9	1503	0.20	3	25	0.754	1478.8	29138	29	2039	2	31176	31	361
45	848	Argusville	2010	22	Clay	0.048	0.23	25	0.165	327.76	1540	0.20	3	25	0.754	1514.67	30678	31	2088	2	32766	33	360
46	847	Argusville	2057.6	22	Clay	0.048	0.23	25	0.165	335.61	1577	0.20	3	25	0.754	1550.54	32255	32	2137	2	34392	34	358
47	846	Argusville	2105.2	22	Clay	0.048	0.23	25	0.165	343.47	1614	0.20	3	25	0.754	1586.41	33869	34	2187	2	36056	36	357
48	845	Argusville	2152.8	22	Clay	0.048	0.23	25	0.165	351.32	1651	0.20	3	25	0.754	1622.28	35520	36	2236	2	37756	38	355
49	844	Weathered" T	2213.4	32	Gravel	0.036	0.35	35	0.273	596.26	2802	0.07	60	35	37.022	81944.6	38322	38	112959	113	151281	151	352
50	843	Weathered" T	2274	32	Gravel	0.036	0.35	35	0.273	612.81	2880	0.07	60	35	37.022	84188.1	41201	41	116052	116	157254	157	349
51	842	Weathered" T	2334.6	32	Gravel	0.036	0.35	35	0.273	629.36	2957	0.07	60	35	37.022	86431.6	44159	44	119145	119	163304	163	346
52	841	Weathered" T	2395.2	32	Gravel	0.036	0.35	35	0.273	645.91	3035	0.07	60	35	37.022	88675.2	47194	47	122237	122	169432	169	343
53	840	Weathered" T	2455.8	32	Gravel	0.036	0.35	35	0.273	662.46	3113	0.07	60	35	37.022	90918.7	50307	50	125330	125	175637	176	340
54	839	Unit "A" Till	2516.4	37	Gravel	0.036	0.35	35	0.413	1026.6	4824	0.07	60	35	82.784	208317	55131	55	287162	287	342293	342	335
55	838	Unit "A" Till	2577	37	Gravel	0.036	0.35	35	0.413	1051.6	4942	0.07	60	35	82.784	213334	60073	60	294077	294</			

Project: FMM Inlet  
 Subject: Alpha Method for Long 14 x 89 - (Modified Su)  
 Computed By: LLS Revised By: Reviewed By:  
 Date: 4/9/2015 Date Revised: Date Reviewed:

Method Alpha  
 Strength Modified Su

**Pile Information**

Pile Number Long 14 x 89  
 Type of Pile HP  
 Size HP 14 x 89  
 Pile Length 58 ft  
 Pile Diameter 14 in  
 Box Perimeter 57.05 in 4.75 ft  
 Tip Area 1.41 sq ft 203 sq in  
 Cross Sectional Area 26.1 sq in  
 Modulus of Elasticity 29,000,000 psi  
 Pile Tip Elevation 835 ft

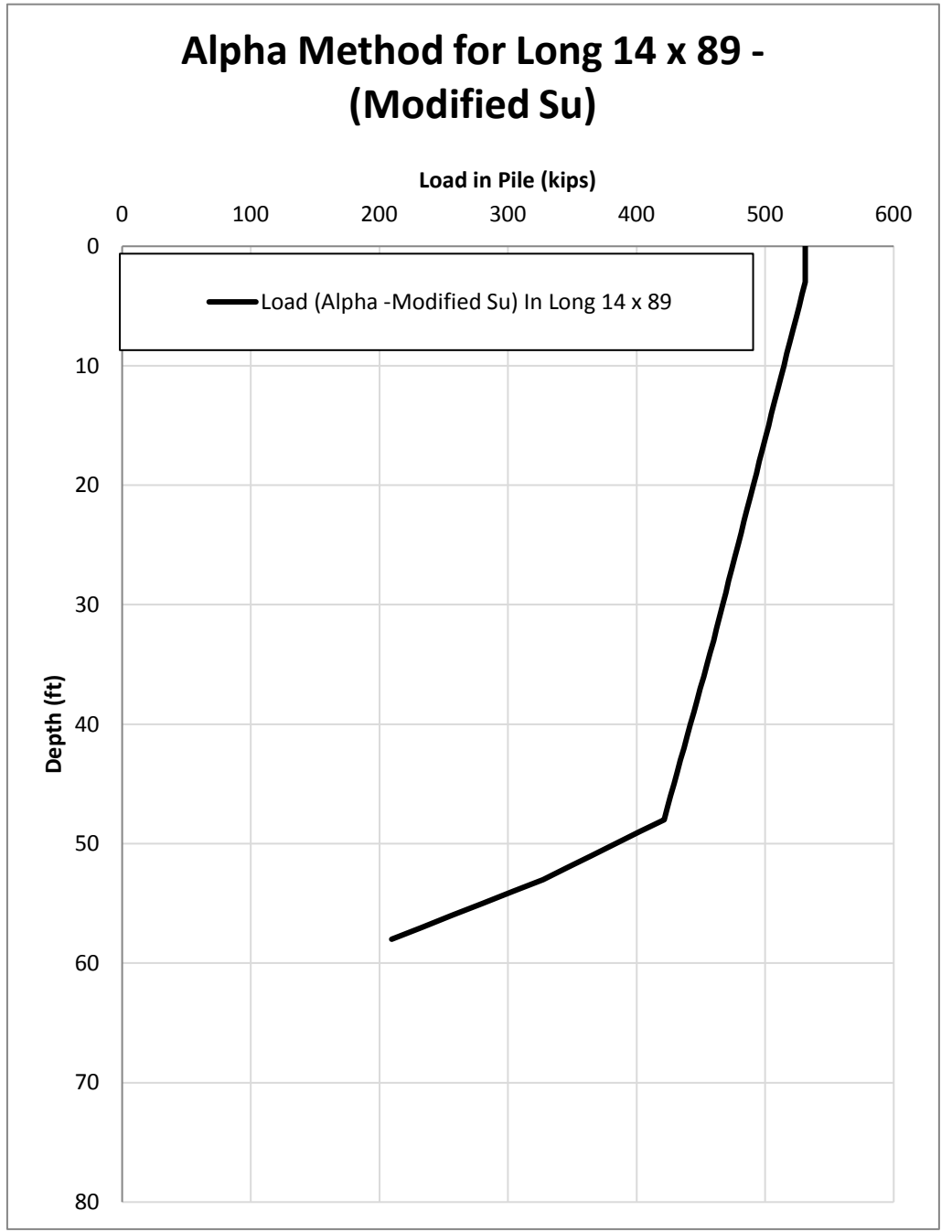
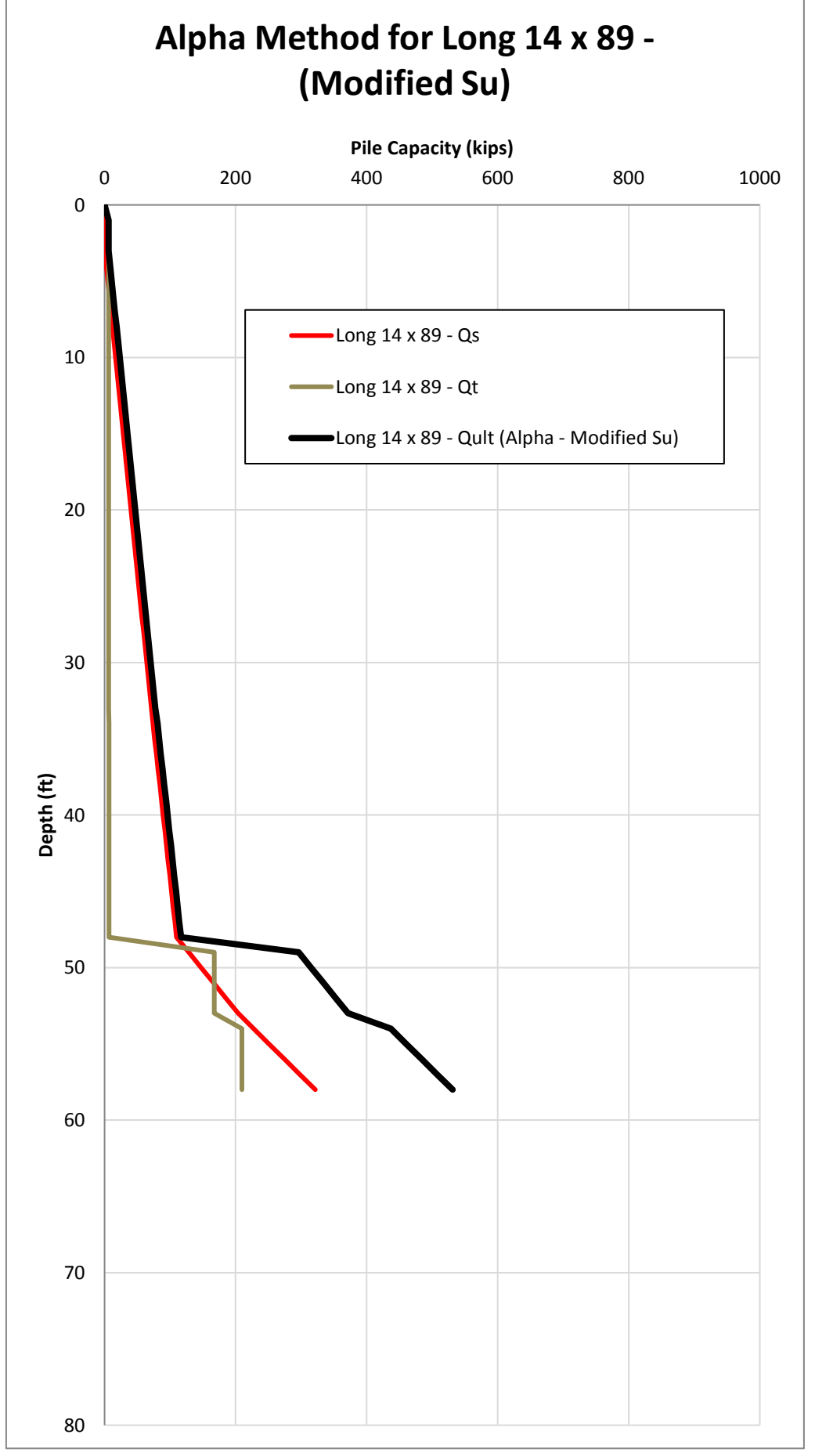
Pile Weight 89 lbs per ft  
 Zero Skin Friction Depth 3 ft  
 Tip Coefficient 9  
 D/b 49.7

Skin 322 kips  
 Tip 210 kips

**Ultimate Capacity**

531202 lbs  
 266 tons  
 531 kips

Depth (ft)	Elev. (ft)	Formation	Modified Su		Su (PEAK)		Su (design)	α	C <sub>s</sub>	q <sub>s</sub>	Long 14 x 89 - Qs		Long 14 x 89 - Qt		Long 14 x 89 - Qult (Alpha - Modified Su)		Load (Alpha - Modified Su) In Long 14 x 89
			(psf)	(kpa)	(psf)	(kpa)					(psf)	lbs	kips	lbs	kips	lbs	
0	893	Brenna									0	0	0	0	0	0	531
1	892	Brenna	500	24	38.3	2	500	1.0	500	0	0	0	6351	6	6351	6	531
2	891	Brenna	500	24	38.3	2	500	1.0	500	0	0	0	6351	6	6351	6	531
3	890	Brenna	500	24	38.3	2	500	1.0	500	0	0	0	6351	6	6351	6	531
4	889	Brenna	500	24	38.3	2	500	1.0	500	2377	2377	2	6351	6	8728	9	529
5	888	Brenna	500	24	38.3	2	500	1.0	500	2377	4754	5	6351	6	11105	11	526
6	887	Brenna	500	24	38.3	2	500	1.0	500	2377	7131	7	6351	6	13482	13	524
7	886	Brenna	500	24	38.3	2	500	1.0	500	2377	9508	10	6351	6	15859	16	522
8	885	Brenna	500	24	38.3	2	500	1.0	500	2377	11885	12	6351	6	18236	18	519
9	884	Brenna	500	24	38.3	2	500	1.0	500	2377	14263	14	6351	6	20613	21	517
10	883	Brenna	500	24	38.3	2	500	1.0	500	2377	16640	17	6351	6	22991	23	515
11	882	Brenna	500	24	38.3	2	500	1.0	500	2377	19017	19	6351	6	25368	25	512
12	881	Brenna	500	24	38.3	2	500	1.0	500	2377	21394	21	6351	6	27745	28	510
13	880	Brenna	500	24	38.3	2	500	1.0	500	2377	23771	24	6351	6	30122	30	507
14	879	Brenna	500	24	38.3	2	500	1.0	500	2377	26148	26	6351	6	32499	32	505
15	878	Brenna	500	24	38.3	2	500	1.0	500	2377	28525	29	6351	6	34876	35	503
16	877	Brenna	500	24	38.3	2	500	1.0	500	2377	30902	31	6351	6	37253	37	500
17	876	Brenna	500	24	38.3	2	500	1.0	500	2377	33279	33	6351	6	39630	40	498
18	875	Brenna	500	24	38.3	2	500	1.0	500	2377	35656	36	6351	6	42007	42	496
19	874	Brenna	500	24	38.3	2	500	1.0	500	2377	38033	38	6351	6	44384	44	493
20	873	Brenna	500	24	38.3	2	500	1.0	500	2377	40410	40	6351	6	46761	47	491
21	872	Brenna	500	24	38.3	2	500	1.0	500	2377	42788	43	6351	6	49138	49	488
22	871	Brenna	500	24	38.3	2	500	1.0	500	2377	45165	45	6351	6	51516	52	486
23	870	Brenna	500	24	38.3	2	500	1.0	500	2377	47542	48	6351	6	53893	54	484
24	869	Brenna	500	24	38.3	2	500	1.0	500	2377	49919	50	6351	6	56270	56	481
25	868	Brenna	500	24	38.3	2	500	1.0	500	2377	52296	52	6351	6	58647	59	479
26	867	Brenna	500	24	38.3	2	500	1.0	500	2377	54673	55	6351	6	61024	61	477
27	866	Brenna	500	24	38.3	2	500	1.0	500	2377	57050	57	6351	6	63401	63	474
28	865	Brenna	500	24	38.3	2	500	1.0	500	2377	59427	59	6351	6	65778	66	472
29	864	Brenna	500	24	38.3	2	500	1.0	500	2377	61804	62	6351	6	68155	68	469
30	863	Brenna	500	24	38.3	2	500	1.0	500	2377	64181	64	6351	6	70532	71	467
31	862	Brenna	500	24	38.3	2	500	1.0	500	2377	66558	67	6351	6	72909	73	465
32	861	Brenna	500	24	38.3	2	500	1.0	500	2377	68935	69	6351	6	75286	75	462
33	860	Brenna	500	24	38.3	2	500	1.0	500	2377	71313	71	6351	6	77663	78	460
34	859	Argusville	540	26	40.7	2	540	1.0	540	2567	73880	74	6859	7	80739	81	457
35	858	Argusville	540	26	40.7	2	540	1.0	540	2567	76447	76	6859	7	83306	83	455
36	857	Argusville	540	26	40.7	2	540	1.0	540	2567	79014	79	6859	7	85873	86	452
37	856	Argusville	540	26	40.7	2	540	1.0	540	2567	81582	82	6859	7	88441	88	450
38	855	Argusville	540	26	40.7	2	540	1.0	540	2567	84149	84	6859	7	91008	91	447
39	854	Argusville	540	26	40.7	2	540	1.0	540	2567	86716	87	6859	7	93575	94	444
40	853	Argusville	540	26	40.7	2	540	1.0	540	2567	89283	89	6859	7	96142	96	442
41	852	Argusville	540	26	40.7	2	540	1.0	540	2567	91851	92	6859	7	98710	99	439
42	851	Argusville	540	26	40.7	2	540	1.0	540	2567	94418	94	6859	7	101277	101	437
43	850	Argusville	540	26	40.7	2	540	1.0	540	2567	96985	97	6859	7	103844	104	434
44	849	Argusville	540	26	40.7	2	540	1.0	540	2567	99552	100	6859	7	106411	106	432
45	848	Argusville	540	26	40.7	2	540	1.0	540	2567	102120	102	6859	7	108979	109	429
46	847	Argusville	540	26	40.7	2	540	1.0	540	2567	104687	105	6859	7	111546	112	427
47	846	Argusville	540	26	40.7	2	540	1.0	540	2567	107254	107	6859	7	114113	114	424
48	845	Argusville	540	26	40.7	2	540	1.0	540	2567	109821	110	6859	7	116680	117	421
49	844	"Weathered" Till	13200	632	287	14	13200	0.3	3960	18827	128648	129	167666	168	296314	296	403
50	843	"Weathered" Till	13200	632	287	14	13200	0.3	3960	18827	147474	147	167666	168	315141	315	384
51	842	"Weathered" Till	13200	632	287	14	13200	0.3	3960	18827	166301	166	167666	168	333967	334	365
52	841	"Weathered" Till	13200	632	287	14	13200	0.3	3960	18827	185127	185	167666	168	352794	353	346
53	840	"Weathered" Till	13200	632	287	14	13200	0.3	3960	18827	203954	204	167666	168	371620	372	327
54	839	Unit "A" Till	16500	790	359	17	16500	0.3	4950	23533	227487	227	209583	210	437070	437	304
55	838	Unit "A" Till	16500	790	359	17	16500	0.3	4950	23533	251020	251	209583	210	460603	461	280
56	837	Unit "A" Till	16500	790	359	17	16500	0.3	4950	23533	274553	275	209583	210	484136	484	257
57	836	Unit "A" Till	16500	790	359	17	16500	0.3	4950	23533	298086	298	209583	210	507669	508	233
58	835	Unit "A" Till	16500	790	359	17	16500	0.3	4950	23533	321619	322	209583	210	531202	531	210



Project: FMM Inlet  
 Subject: Beta Method for Long 14 x 89 - (Modified f')  
 Computed By: LLS  
 Date: 4/9/2015

Revised By:  
 Date Revised:

Method Beta  
 Strength Modified f'

**Pile Information**

Pile Number Long 14 x 89  
 Type of Pile HP  
 Size HP 14 x 89  
 Pile Length 58 ft  
 Pile Diameter 14 in  
 Perimeter 57.05 in  
 Tip Area 1.41 sq ft  
 Cross Sectional Area 26.1 sq in  
 Modulus of Elasticity 29,000,000 psi  
 Pile Tip Elevation 835 ft

Pile Weight 89 lbs per ft  
 Zero Skin Friction Depth 3 ft  
 D/b 49.7

Skin 76 kips  
 Tip 322 kips

**Ultimate Capacity**  
 398814 lbs  
 199 tons  
 399 kips

Depth (ft)	Elev. (ft)	Formation	σ'vo (psf)	Soil Type	Slope	"βo"	"φo"	β	fs	qs	Slope	"N60"	"φc"	Nt	qt	Long 14 x 89 - Qs		Long 14 x 89 - Qt		Long 14 x 89 - Qult (Beta - Modified f')		Load (Beta - Modified f') In Long 14	
																lbs	kips	lbs	kips	lbs	kips		kips
0	893	Brenna	0	20	Clay	0.0481	0.23	25	0.132	0	0	0.20	3	25	0.300	0	0	0	0	0	0	399	
1	892	Brenna	44	20	Clay	0.0481	0.23	25	0.132	0	0	0.20	3	25	0.300	13.08	0	0	18	0	18	0	399
2	891	Brenna	87	20	Clay	0.0481	0.23	25	0.132	0	0	0.20	3	25	0.300	26.16	0	0	37	0	37	0	399
3	890	Brenna	131	20	Clay	0.0481	0.23	25	0.132	0	0	0.20	3	25	0.300	39.24	0	0.0	55	0	55	0	399
4	889	Brenna	174	20	Clay	0.0481	0.23	25	0.132	20	96	0.20	3	25	0.300	52.32	96	0.1	74	0	170	0	399
5	888	Brenna	218	20	Clay	0.0481	0.23	25	0.132	26	123	0.20	3	25	0.300	65.4	219	0.2	92	0	312	0	399
6	887	Brenna	262	20	Clay	0.0481	0.23	25	0.132	32	151	0.20	3	25	0.300	78.48	370	0.4	111	0	481	0	398
7	886	Brenna	305	20	Clay	0.0481	0.23	25	0.132	37	178	0.20	3	25	0.300	91.56	548	0.5	129	0	677	1	398
8	885	Brenna	349	20	Clay	0.0481	0.23	25	0.132	43	206	0.20	3	25	0.300	104.6	754	0.8	148	0	902	1	398
9	884	Brenna	392	20	Clay	0.0481	0.23	25	0.132	49	233	0.20	3	25	0.300	117.7	987	1	166	0	1153	1	398
10	883	Brenna	436	20	Clay	0.0481	0.23	25	0.132	55	260	0.20	3	25	0.300	130.8	1247	1	185	0	1432	1	398
11	882	Brenna	480	20	Clay	0.0481	0.23	25	0.132	61	288	0.20	3	25	0.300	143.9	1535	2	203	0	1738	2	397
12	881	Brenna	523	20	Clay	0.0481	0.23	25	0.132	66	315	0.20	3	25	0.300	157	1850	2	222	0	2072	2	397
13	880	Brenna	567	20	Clay	0.0481	0.23	25	0.132	72	343	0.20	3	25	0.300	170	2193	2	240	0	2433	2	397
14	879	Brenna	610	20	Clay	0.0481	0.23	25	0.132	78	370	0.20	3	25	0.300	183.1	2563	3	258	0	2822	3	396
15	878	Brenna	654	20	Clay	0.0481	0.23	25	0.132	84	397	0.20	3	25	0.300	196.2	2961	3	277	0	3238	3	396
16	877	Brenna	698	20	Clay	0.0481	0.23	25	0.132	89	425	0.20	3	25	0.300	209.3	3386	3	295	0	3681	4	395
17	876	Brenna	741	20	Clay	0.0481	0.23	25	0.132	95	452	0.20	3	25	0.300	222.4	3838	4	314	0	4152	4	395
18	875	Brenna	785	20	Clay	0.0481	0.23	25	0.132	101	480	0.20	3	25	0.300	235.4	4318	4	332	0	4650	5	394
19	874	Brenna	828	20	Clay	0.0481	0.23	25	0.132	107	507	0.20	3	25	0.300	248.5	4825	5	351	0	5175	5	394
20	873	Brenna	872	20	Clay	0.0481	0.23	25	0.132	112	535	0.20	3	25	0.300	261.6	5359	5	369	0	5728	6	393
21	872	Brenna	916	20	Clay	0.0481	0.23	25	0.132	118	562	0.20	3	25	0.300	274.7	5921	6	388	0	6309	6	393
22	871	Brenna	959	20	Clay	0.0481	0.23	25	0.132	124	589	0.20	3	25	0.300	287.8	6511	7	406	0	6917	7	392
23	870	Brenna	1003	20	Clay	0.0481	0.23	25	0.132	130	617	0.20	3	25	0.300	300.8	7127	7	425	0	7552	8	392
24	869	Brenna	1046	20	Clay	0.0481	0.23	25	0.132	136	644	0.20	3	25	0.300	313.9	7772	8	443	0	8215	8	391
25	868	Brenna	1090	20	Clay	0.0481	0.23	25	0.132	141	672	0.20	3	25	0.300	327	8443	8	462	0	8905	9	390
26	867	Brenna	1134	20	Clay	0.0481	0.23	25	0.132	147	699	0.20	3	25	0.300	340.1	9142	9	480	0	9622	10	390
27	866	Brenna	1177	20	Clay	0.0481	0.23	25	0.132	153	726	0.20	3	25	0.300	353.2	9869	10	498	0	10367	10	389
28	865	Brenna	1221	20	Clay	0.0481	0.23	25	0.132	159	754	0.20	3	25	0.300	366.2	10623	11	517	1	11139	11	388
29	864	Brenna	1264	20	Clay	0.0481	0.23	25	0.132	164	781	0.20	3	25	0.300	379.3	11404	11	535	1	11939	12	387
30	863	Brenna	1308	20	Clay	0.0481	0.23	25	0.132	170	809	0.20	3	25	0.300	392.4	12212	12	554	1	12766	13	387
31	862	Brenna	1352	20	Clay	0.0481	0.23	25	0.132	176	836	0.20	3	25	0.300	405.5	13049	13	572	1	13621	14	386
32	861	Brenna	1395	20	Clay	0.0481	0.23	25	0.132	182	864	0.20	3	25	0.300	418.6	13912	14	591	1	14503	15	385
33	860	Brenna	1439	20	Clay	0.0481	0.23	25	0.132	187	891	0.20	3	25	0.300	431.6	14803	15	609	1	15412	15	384
34	859	Argusville	1486	22	Clay	0.0481	0.23	25	0.165	241	1147	0.20	3	25	0.754	1120	15950	16	1581	2	17531	18	383
35	858	Argusville	1534	22	Clay	0.0481	0.23	25	0.165	249	1185	0.20	3	25	0.754	1156	17135	17	1631	2	18767	19	382
36	857	Argusville	1582	22	Clay	0.0481	0.23	25	0.165	257	1222	0.20	3	25	0.754	1192	18357	18	1682	2	20039	20	380
37	856	Argusville	1629	22	Clay	0.0481	0.23	25	0.165	265	1259	0.20	3	25	0.754	1228	19617	20	1733	2	21350	21	379
38	855	Argusville	1677	22	Clay	0.0481	0.23	25	0.165	273	1297	0.20	3	25	0.754	1264	20914	21	1783	2	22697	23	378
39	854	Argusville	1724	22	Clay	0.0481	0.23	25	0.165	281	1334	0.20	3	25	0.754	1299	22248	22	1834	2	24082	24	377
40	853	Argusville	1772	22	Clay	0.0481	0.23	25	0.165	288	1371	0.20	3	25	0.754	1335	23619	24	1885	2	25504	26	375
41	852	Argusville	1820	22	Clay	0.0481	0.23	25	0.165	296	1409	0.20	3	25	0.754	1371	25028	25	1935	2	26963	27	374
42	851	Argusville	1867	22	Clay	0.0481	0.23	25	0.165	304	1446	0.20	3	25	0.754	1407	26474	26	1986	2	28460	28	372
43	850	Argusville	1915	22	Clay	0.0481	0.23	25	0.165	312	1484	0.20	3	25	0.754	1443	27958	28	2036	2	29994	30	371
44	849	Argusville	1962	22	Clay	0.0481	0.23	25	0.165	320	1521	0.20	3	25	0.754	1479	29479	29	2087	2	31566	32	369
45	848	Argusville	2010	22	Clay	0.0481	0.23	25	0.165	328	1558	0.20	3	25	0.754	1515	31037	31	2138	2	33175	33	368
46	847	Argusville	2058	22	Clay	0.0481	0.23	25	0.165	336	1596	0.20	3	25	0.754	1551	32632	33	2188	2	34821	35	366
47	846	Argusville	2105	22	Clay	0.0481	0.23	25	0.165	343	1633	0.20	3	25	0.754	1586	34265	34	2239	2	36504	37	365
48	845	Argusville	2153	22	Clay	0.0481	0.23	25	0.165	351	1670	0.20	3	25	0.754	1622	35936	36	2290	2	38225	38	363
49	844	"Weathered" Till	2213	32	Gravel	0.0359	0.35	35	0.273	596	2835	0.07	60	35	37.022	81945	38770	39	115651	116	154421	154	360
50	843	"Weathered" Till	2274	32	Gravel	0.0359	0.35	35	0.273	613	2913	0.07	60	35	37.022	84188	41684	42	118817	119	160501	161	357
51	842	"Weathered" Till	2335	32	Gravel	0.0359	0.35	35	0.273	629	2992	0.07	60	35	37.022	86432	44676	45	121984	122	166660	167	354
52	841	"Weathered" Till	2395	32	Gravel	0.0359	0.35	35	0.273	646	3071	0.07	60	35	37.022	88675	47747	48	125150	125	172897	173	351
53	840	"Weathered" Till	2456	32	Gravel	0.0359	0.35	35	0.273	662	3149	0.07	60	35	37.022	90919	50896	51	128317	128	179213	179	348
54	839	Unit "A" Till	2516	37	Gravel	0.0359	0.35	35	0.413	1027	4881	0.07	60	35	82.784	2E+05	55777	56	294005	294	349781	350	343
55	838	Unit "A" Till	2577	37	Gravel	0.0359	0.35	35	0.413	1052	4999	0.07	60	35	82.784	2E+05	60776	61	301085	301	361861	362	338
56	837	Unit "A" Till	2638	37	Gravel	0.0359	0.35	35	0.413	1077	5118	0.07	60	35	82.784	2E+05	65894	66	308165	308	374060	374	333
57	836	Unit "A" Till	2698	37	Gravel	0.0359																	