

Directional Survey Calculations	Measured Depth (ft)	Sub-Sea Incl. (deg)	Vertical Azim. (ft)	True Vert Depth (ft)	Northings (+) Southings (-) (ft)	Eastings (+) Westings (-) (ft)	Vert Section (ft)	DLS deg/100' (deg)	FNL	FSL	FWL	FEL
SHL	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	165	5096	2340	2948
BHL	8987	89.45	174.48	4612.78	-4755.17	-37.05	4755.08	0.00	4920	341	2258	3039
Miss Entry	4738	61.35	188.41	4541.95	-521.95	-102.48	523.69	10.28	685	4576	2232	3057
Top Perf	4885	76.30	182.53	4592.71	-658.69	-115.96	660.65	8.54	822	4439	2218	3072
Bottom Perf	8870	89.12	174.97	4611.40	-4638.68	-47.92	4638.80	0.64	4803	458	2248	3048

Survey Points	NW Corner XY Coord	X	Y	Surface XY	X	Y	m			
							North Line slope	East Line slope	South Line slope	West Line slope
	2150617	156268		2152958	156142	0.0166446	-0.0112231	0.01756042	-0.0095021	
	2150667	151006								
	2155904	156356								
	2155983	151099								

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0	0.0	0	0	0	0	0	0	165	5096	2340	2948	
631	1.53	212.22	630.93	-6.96	-4.38	7.03	0.25	172	5089	2335	2953	
723	0.54	144.84	722.91	-8.35	-4.79	8.44	1.54	173	5088	2335	2953	
815	0.19	91.33	814.91	-8.71	-4.39	8.79	0.49	174	5087	2335	2953	
907	0.19	313.66	906.91	-8.61	-4.35	8.68	0.39	174	5087	2335	2953	
999	0.36	195.95	998.91	-8.78	-4.54	8.86	0.52	174	5087	2335	2953	
1091	0.30	167.06	1090.91	-9.29	-4.56	9.37	0.19	174	5087	2335	2953	
1183	0.43	103.76	1182.91	-9.61	-4.17	9.68	0.43	175	5086	2336	2953	
1275	0.39	25.29	1274.91	-9.41	-3.70	9.47	0.56	174	5086	2336	2952	
1367	0.16	186.82	1366.90	-9.25	-3.58	9.32	0.59	174	5087	2336	2952	
1459	0.50	44.51	1458.90	-9.09	-3.32	9.15	0.69	174	5087	2336	2952	
1549	0.10	268.12	1548.90	-8.82	-3.12	8.87	0.64	174	5087	2337	2952	
1640	0.37	222.18	1639.90	-9.04	-3.40	9.10	0.34	174	5087	2336	2952	
1732	0.18	212.43	1731.90	-9.38	-3.67	9.44	0.21	174	5086	2336	2952	
1826	0.68	313.83	1825.90	-9.12	-4.16	9.19	0.78	174	5087	2336	2953	
1921	0.46	226.22	1920.90	-8.99	-4.84	9.08	0.85	174	5087	2335	2953	
2016	0.50	336.73	2015.89	-8.87	-5.28	8.97	0.83	174	5087	2334	2954	
2111	0.21	177.02	2110.89	-8.67	-5.43	8.76	0.74	174	5087	2334	2954	
2206	0.35	171.23	2205.89	-9.13	-5.38	9.22	0.15	174	5087	2334	2954	
2301	0.39	48.43	2300.89	-9.20	-5.09	9.29	0.68	174	5087	2335	2954	
2397	0.13	21.41	2396.89	-8.88	-4.81	8.97	0.29	174	5087	2335	2953	
2492	0.18	171.89	2491.89	-8.93	-4.75	9.01	0.32	174	5087	2335	2953	
2587	0.52	185.95	2586.89	-9.51	-4.77	9.59	0.37	174	5086	2335	2953	
2681	0.31	96.72	2680.89	-9.96	-4.56	10.04	0.64	175	5086	2335	2953	
2776	0.18	100.63	2775.88	-10.02	-4.16	10.09	0.14	175	5086	2336	2953	
2871	0.53	109.74	2870.88	-10.19	-3.60	10.26	0.37	175	5086	2336	2952	
2966	0.37	25.68	2965.88	-10.07	-3.06	10.12	0.65	175	5086	2337	2952	
3061	0.10	344.83	3060.88	-9.71	-2.94	9.76	0.32	175	5086	2337	2951	
3156	0.09	141.21	3155.88	-9.69	-2.92	9.74	0.20	175	5086	2337	2951	
3251	0.03	250.10	3250.88	-9.75	-2.90	9.80	0.11	175	5086	2337	2951	
3345	0.34	144.88	3344.88	-9.99	-2.76	10.04	0.37	175	5086	2337	2951	
3440	0.44	206.59	3439.88	-10.55	-2.76	10.59	0.43	175	5085	2337	2951	
3535	1.86	169.56	3534.86	-12.39	-2.64	12.43	1.61	177	5083	2337	2951	
3630	0.68	142.75	3629.83	-14.35	-2.02	14.39	1.36	179	5081	2338	2951	
3693	1.03	170.16	3692.83	-15.21	-1.70	15.24	0.84	180	5081	2338	2950	
3724	2.26	189.98	3723.81	-16.09	-1.76	16.12	4.31	181	5080	2338	2950	
3756	3.89	202.86	3755.77	-17.71	-2.29	17.75	5.50	183	5078	2337	2951	
3788	5.37	209.73	3787.66	-20.01	-3.45	20.07	4.93	185	5076	2336	2952	
3819	6.20	215.92	3818.50	-22.62	-5.15	22.71	3.35	188	5073	2334	2954	
3851	7.47	217.78	3850.27	-25.67	-7.44	25.80	4.03	191	5070	2332	2956	
3883	9.62	214.01	3881.92	-29.53	-10.21	29.71	6.94	194	5066	2329	2959	
3914	12.65	203.17	3912.33	-34.80	-13.00	35.02	11.84	200	5061	2326	2962	
3946	15.80	198.60	3943.35	-42.15	-15.77	42.42	10.44	207	5054	2324	2965	
3978	17.14	202.03	3974.04	-50.65	-18.93	50.98	5.17	215	5045	2320	2968	
4009	20.25	202.00	4003.40	-59.86	-22.65	60.26	10.03	224	5036	2317	2972	
4041	22.34	198.96	4033.21	-70.75	-26.70	71.21	7.38	235	5025	2312	2976	
4073	23.33	195.05	4062.71	-82.62	-30.32	83.15	5.66	247	5014	2309	2980	
4105	24.80	189.80	4091.93	-95.36	-33.11	95.93	8.11	260	5001	2306	2983	
4136	27.64	186.91	4119.73	-108.90	-35.08	109.51	10.04	273	4987	2304	2985	
4168	29.51	184.94	4147.84	-124.13	-36.65	124.76	6.54	288	4972	2302	2986	
4200	31.66	184.83	4175.38	-140.35	-38.04	141.00	6.72	305	4956	2300	2988	
4231	33.34	185.90	4201.53	-156.93	-39.60	157.61	5.73	321	4940	2299	2990	
4263	33.47	189.10	4228.24	-174.39	-41.90	175.11	5.52	339	4922	2296	2992	
4295	36.21	191.21	4254.51	-192.38	-45.13	193.15	9.35	357	4904	2293	2996	
4326	39.80	191.90	4278.93	-211.08	-48.96	211.92	11.66	375	4886	2289	3000	
4358	43.70	191.54	4302.80	-231.94	-53.29	232.85	12.21	396	4865	2284	3004	
4390	46.41	190.79	4325.40	-254.16	-57.67	255.14	8.63	418	4843	2280	3009	
Top of Tangent @ 4420'	4422	48.65	189.90	4347.01	-277.38	-61.90	278.43	7.29	441	4819	2275	3013
4485	49.21	189.58	4388.40	-324.19	-69.94	325.38	0.97	488	4773	2267	3022	
4549	49.49	189.84	4430.09	-372.05	-78.13	373.38	0.54	536	4725	2258	3031	
Btm of Tangent @ 4610'	4580	50.39	190.01	4450.04	-395.42	-82.22	396.82	2.93	559	4702	2254	3035
4612	50.39	189.86	4470.44	-419.70	-86.47	421.18	0.36	583	4678	2249	3040	
4643	52.20	189.32	4489.83	-443.56	-90.50	445.10	5.99	607	4654	2245	3044	
4675	55.21	188.93	4508.77	-469.02	-94.59	470.63	9.46	632	4628	2241	3048	
4706	58.06	188.31	4525.81	-494.61	-98.47	496.29	9.34	658	4603	2237	3052	
4738	61.35	188.41	4541.95	-521.95	-102.48	523.69	10.28	685	4576	2232	3057	
4770	65.56	187.62	4556.25	-550.29	-106.47	552.09	13.34	713	4547	2228	3061	
4801	68.94	186.40	4568.24	-578.66	-109.95	580.52	11.49	742	4519	2224	3065	
4833	72.13	184.86	4578.90	-608.68	-112.91	610.59	10.95	772	4489	2221	3068	

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4864	74.99	183.31	4587.67	-638.33	-115.03	640.28	10.40	801	4459	2219	3071	
4900	77.24	181.98	4596.31	-673.24	-116.64	675.21	7.21	836	4425	2217	3073	
4931	78.51	181.35	4602.82	-703.53	-117.52	705.51	4.55	867	4394	2216	3074	
4963	79.93	182.34	4608.81	-734.95	-118.53	736.94	5.38	898	4363	2214	3075	
4994	81.88	182.92	4613.71	-765.53	-119.93	767.54	6.56	928	4332	2213	3077	
5026	84.62	182.38	4617.47	-797.27	-121.40	799.30	8.72	960	4301	2211	3079	
5058	86.70	182.18	4619.89	-829.15	-122.67	831.20	6.53	992	4269	2209	3080	
5153	88.55	179.55	4623.83	-924.05	-124.10	926.11	3.38	1087	4174	2207	3083	
5248	89.41	179.60	4625.52	-1019.03	-123.40	1021.06	0.91	1182	4079	2207	3083	
5343	91.11	179.97	4625.09	-1114.02	-123.04	1116.04	1.83	1277	3984	2206	3084	
5438	91.66	180.54	4622.79	-1208.99	-123.46	1211.00	0.83	1372	3889	2205	3085	
5533	92.37	179.09	4619.45	-1303.93	-123.16	1305.92	1.70	1467	3794	2204	3086	
5627	89.41	179.28	4617.99	-1397.90	-121.82	1399.85	3.16	1561	3700	2205	3086	
5722	92.13	180.21	4616.71	-1492.88	-121.40	1494.80	3.03	1656	3605	2204	3087	
5817	91.42	179.88	4613.77	-1587.83	-121.47	1589.74	0.82	1751	3510	2203	3088	
5911	89.32	177.92	4613.17	-1681.80	-119.67	1683.67	3.06	1845	3416	2204	3087	
6006	90.09	177.78	4613.65	-1776.73	-116.10	1778.52	0.82	1940	3321	2207	3084	
6101	90.83	177.51	4612.89	-1871.65	-112.20	1873.35	0.83	2035	3226	2210	3082	
6196	89.63	176.92	4612.51	-1966.54	-107.59	1968.14	1.41	2130	3131	2214	3078	
6291	88.55	177.84	4614.02	-2061.42	-103.24	2062.93	1.49	2225	3036	2217	3075	
6386	88.74	178.10	4616.27	-2156.34	-99.88	2157.77	0.34	2320	2941	2219	3072	
6481	86.95	177.63	4619.84	-2251.20	-96.34	2252.56	1.95	2415	2846	2222	3070	
6576	90.95	178.85	4621.58	-2346.12	-93.43	2347.41	4.40	2510	2751	2224	3068	
6671	90.43	179.42	4620.43	-2441.10	-91.99	2442.35	0.81	2605	2656	2225	3068	
6766	91.45	179.35	4618.88	-2536.08	-90.97	2537.30	1.08	2700	2561	2225	3068	
6861	91.97	178.99	4616.04	-2631.03	-89.60	2632.20	0.67	2794	2466	2225	3068	
6956	89.88	179.27	4614.51	-2726.00	-88.16	2727.13	2.22	2889	2371	2226	3067	
7050	89.60	178.49	4614.93	-2819.98	-86.32	2821.07	0.88	2984	2277	2227	3066	
7145	89.75	178.87	4615.47	-2914.95	-84.13	2915.99	0.43	3079	2182	2228	3065	
7241	89.45	178.46	4616.14	-3010.92	-81.89	3011.90	0.53	3175	2086	2229	3064	
7336	90.09	179.76	4616.52	-3105.91	-80.42	3106.85	1.53	3270	1991	2230	3064	
7431	89.85	179.96	4616.57	-3200.91	-80.19	3201.83	0.33	3365	1896	2229	3065	
7526	89.45	180.40	4617.15	-3295.90	-80.48	3296.81	0.63	3460	1801	2228	3066	
7621	90.59	180.19	4617.12	-3390.90	-80.97	3391.80	1.22	3555	1706	2227	3067	
7715	89.04	179.39	4617.42	-3484.90	-80.63	3485.78	1.86	3649	1612	2226	3068	
7810	88.28	179.77	4619.65	-3579.87	-79.93	3580.72	0.89	3744	1517	2226	3069	
7905	90.65	179.43	4620.53	-3674.85	-79.27	3675.68	2.52	3838	1422	2226	3069	
8000	91.39	179.24	4618.84	-3769.83	-78.17	3770.63	0.80	3933	1327	2226	3069	
8095	93.52	179.16	4614.77	-3864.73	-76.84	3865.48	2.24	4028	1232	2226	3069	
8189	92.62	178.59	4609.74	-3958.57	-75.00	3959.28	1.13	4122	1139	2227	3068	
8285	91.11	179.01	4606.61	-4054.50	-72.99	4055.16	1.63	4218	1043	2228	3067	
8379	90.68	178.94	4605.15	-4148.47	-71.31	4149.09	0.46	4312	949	2229	3066	
8474	90.31	178.87	4604.33	-4243.45	-69.49	4244.02	0.40	4407	854	2230	3066	
8569	88.80	178.32	4605.06	-4338.42	-67.16	4338.93	1.69	4502	759	2231	3064	
8664	88.43	176.91	4607.36	-4433.30	-63.21	4433.73	1.53	4597	664	2234	3061	
8759	88.95	175.65	4609.53	-4528.08	-57.05	4528.38	1.43	4692	569	2240	3056	
8854	89.05	175.08	4611.19	-4622.75	-49.37	4622.90	0.61	4787	474	2247	3050	
8944	89.45	174.48	4612.37	-4712.37	-41.19	4712.36	0.80	4877	384	2254	3042	
TD	8987	89.45	174.48	4612.78	-4755.17	-37.05	4755.08	0.00	4920	341	2258	3039