Directional Survey Report

Company Name:	Shell Western E&P	State/Prov:	Texas	Survey Company:	Premier Directional Drilling	Proposed Azimuth:	163.72
Well Name:	University 19 PW Unit 1503H	County:	Loving County	Job Number:	M17030	Declination:	7.15
Field:	Delaware Basin	Location:	Mentone, TX	Latitude:	31.6926	North Reference:	Grid
Rig ID:	Precision 563	API/UWI:	42301331700000	Longitude:	-103.4343	KB:	2761.20

Svy	Depth	Inc	Azm	TVD	NS	EW	VS	DLS	Temp
Tiein	0	0	0	0	0	0	0	0	0
1	185	0.87	218.13	184.99	-1.10	-0.87	0.82	0.47	45.10
2	341	1.17	231.75	340.97	-3.02	-2.85	2.10	0.25	48.70
3	527	4.10	259	526.76	-5.47	-10.87	2.20	1.67	53.10
4	715	8.54	266.97	713.57	-7.49	-31.42	-1.62	2.40	170.70
5	903	9.68	266.21	899.20	-9.27	-61.13	-8.24	0.61	70.70
6	1085	10.25	267.16	1,078.45	-11.09	-92.57	-15.31	0.33	67.20
7	1264	10.66	266.06	1,254.48	-13.01	-124.99	-22.55	0.25	67.20
8	1443	12.07	264.61	1,429.96	-15.91	-160.14	-29.62	0.80	67.20
9	1622	12.45	264.72	1,604.88	-19.44	-197.99	-36.84	0.21	67.20
10	1801	12.39	264.07	1,779.69	-23.20	-236.30	-43.97	0.08	97.10
11	1980	12.55	265.06	1,954.47	-26.86	-274.78	-51.25	0.15	80.70
12	2159	12.78	260.85	2,129.12	-31.68	-313.70	-57.53	0.53	82.50
13	2338	13.56	255.09	2,303.42	-40.23	-353.53	-60.49	0.85	91.30
14	2517	13.54	253.18	2,477.43	-51.69	-393.86	-60.79	0.25	92.70
15	2695	13.25	242.12	2,650.62	-67.26	-431.85	-56.49	1.45	98.40
16	2875	12.72	242.62	2,826.02	-86.02	-467.68	-48.53	0.30	105.90
17	3054	11.99	242.45	3,000.87	-103.69	-501.66	-41.10	0.41	114.20
18	3233	11.15	242.19	3,176.23	-120.36	-533.46	-34.01	0.47	110.70
19	3412	9.82	240.89	3,352.24	-135.86	-562.10	-27.16	0.75	91.30
20	3591	8.72	237.23	3,528.90	-150.63	-586.85	-19.92	0.70	101.90
21	3770	8.34	234.86	3,705.92	-165.45	-608.87	-11.87	0.29	107.20
22	3949	6.63	230.22	3,883.39	-179.53	-627.43	-3.55	1.01	112.50
23	4128	5.77	228.22	4,061.34	-192.14	-642.08	4.44	0.50	105.40
24	4307	5.55	228.92	4,239.47	-203.83	-655.32	11.95	0.13	110.70
25	4485	5.17	225.25	4,416.69	-215.13	-667.50	19.38	0.29	105.40
26	4665	4.78	223.13	4,596.01	-226.31	-678.39	27.06	0.24	108.90
27	4820	4.16	218.89	4,750.54	-235.40	-686.33	33.56	0.45	114.20
28	4918	4.23	222.10	4,848.28	-240.85	-690.99	37.48	0.25	94.50
29	5097	3.81	216.62	5,026.84	-250.52	-698.96	44.53	0.32	89.20
30	5276	3.70	218.99	5,205.45	-259.78	-706.14	51.41	0.11	80.40
31	5455	3.95	217.55	5,384.06	-269.16	-713.54	58.34	0.15	80.70
32	5634	3.70	221.30	5,562.66	-278.39	-721.10	65.08	0.20	73.30
33	5813	3.73	219.11	5,741.28	-287.24	-728.59	71.48	0.08	72.40

Svy	Depth	Inc	Azm	TVD	NS	EW	VS	DLS	Temp
34	5992	3.28	218.65	5,919.95	-295.76	-735.46	77.73	0.25	71.60
35	6171	3.44	217.93	6,098.64	-303.99	-741.96	83.81	0.09	71.60
36	6350	3.43	212.84	6,277.32	-312.73	-748.16	90.46	0.17	72.40
37	6529	2.65	214.67	6,456.06	-320.63	-753.42	96.57	0.44	76.80
38	6708	0.81	212.99	6,634.97	-325.10	-756.47	100.00	1.03	82.10
39	6887	0.85	224.14	6,813.96	-327.11	-758.08	101.48	0.09	84.20
40	7065	1.06	217.88	6,991.93	-329.36	-760.01	103.10	0.13	89.50
41	7244	1.13	226.33	7,170.90	-331.88	-762.30	104.88	0.10	91.30
42	7423	0.96	209.76	7,349.87	-334.40	-764.32	106.73	0.19	94.80
43	7602	1.16	219.22	7,528.84	-337.11	-766.21	108.80	0.15	98.40
44	7781	1.80	226.34	7,707.78	-340.45	-769.39	111.12	0.37	101.90
45	7960	1.62	223.77	7,886.70	-344.22	-773.18	113.67	0.11	107.70
46	8139	1.59	225.28	8,065.63	-347.80	-776.69	116.12	0.03	111.20
47	8318	1.75	230.31	8,244.55	-351.29	-780.56	118.39	0.12	112.50
48	8497	1.60	234.62	8,423.48	-354.48	-784.70	120.29	0.11	112
49	8676	1.22	222.95	8,602.42	-357.32	-788.04	122.08	0.27	117.40
50	8855	1.45	239.02	8,781.37	-359.88	-791.28	123.63	0.24	117.80
51	9034	1.25	249.73	8,960.32	-361.73	-795.05	124.34	0.18	119.50
52	9213	1.60	276.87	9,139.27	-362.10	-799.36	123.50	0.42	131.90
53	9392	0.89	259.09	9,318.23	-362.07	-803.21	122.39	0.45	131.90
54	9571	1.09	280.32	9,497.20	-362.03	-806.25	121.49	0.23	131.90
55	9750	2.07	263.31	9,676.13	-362.10	-811.13	120.19	0.60	133.60
56	9929	1.58	252.30	9,855.04	-363.22	-816.70	119.71	0.34	135.40
57	10108	1.24	264.33	10,033.99	-364.17	-820.97	119.42	0.25	137.20
58	10287	0.69	222.95	10,212.96	-365.15	-823.64	119.61	0.48	137.20
59	10466	0.85	227	10,391.95	-366.84	-825.34	120.76	0.09	138.90
60	10646	1.24	199.03	10,571.92	-369.59	-826.95	122.95	0.35	140.70
61	10825	1.09	229.54	10,750.88	-372.53	-828.88	125.23	0.35	140.70
62	10914	1.25	241.32	10,839.86	-373.54	-830.38	125.79	0.32	142.50
63	11009	3.59	179.33	10,934.78	-377.02	-831.25	128.87	3.37	130.60
64	11099	14.21	169.55	11,023.58	-390.74	-829.21	142.62	11.88	130.10
65	11189	25.17	161.11	11,108.20	-419.80	-820.98	172.82	12.55	131.90
66	11278	33.17	155.19	11,185.87	-459.88	-804.61	215.89	9.55	132.30
67	11368	38.85	157.04	11,258.64	-508.26	-783.25	268.31	6.43	134.10
68	11458	43.09	160.19	11,326.59	-563.21	-761.81	327.07	5.24	134.10
69	11548	47.95	159.72	11,389.63	-623.51	-739.79	391.12	5.41	137.20
70	11637	54.43	160.88	11,445.38	-688.78	-716.46	460.31	7.35	137.20
71	11726	64.09	161.44	11,490.82	-761.09	-691.80	536.64	10.87	137.20
72	11816	76.24	158.63	11,521.30	-840.48	-662.88	620.95	13.81	138.90
73	11859	83.57	158.34	11,528.84	-879.84	-647.36	663.08	17.06	138.90
74	11970	91.58	158.38	11,533.53	-982.84	-606.50	773.41	7.22	151.70
75	12060	89.17	156.34	11,532.94	-1,065.89	-571.86	862.84	3.51	151.30
76	12150	89.96	157.07	11,533.62	-1,148.55	-536.27	952.16	1.20	153.50
77	12239	89.91	159.75	11,533.72	-1,231.30	-503.52	1,040.77	3.01	160.10
78	12329	88.08	158.73	11,535.30	-1,315.44	-471.63	1,130.48	2.33	161.90

Svy	Depth	Inc	Azm	TVD	NS	EW	VS	DLS	Temp
79	12419	88.54	158.38	11,537.96	-1,399.17	-438.74	1,220.07	0.64	165.40
80	12509	87.36	158.85	11,541.18	-1,482.92	-405.94	1,309.66	1.41	167.20
81	12599	85.72	158.50	11,546.61	-1,566.60	-373.27	1,399.14	1.86	168.90
82	12688	90.55	162.21	11,549.50	-1,650.34	-343.39	1,487.90	6.84	164.90
83	12778	89.59	160.22	11,549.39	-1,735.54	-314.41	1,577.81	2.45	165.40
84	12868	88.96	160.27	11,550.53	-1,820.23	-283.99	1,667.64	0.70	168.90
85	12958	91.07	166.54	11,550.51	-1,906.44	-258.30	1,757.59	7.35	170.20
86	13048	90.66	170.01	11,549.15	-1,994.54	-240.02	1,847.28	3.88	163.60
87	13137	89.84	168.70	11,548.76	-2,082.00	-223.58	1,935.84	1.74	170.70
88	13227	90.35	175.60	11,548.61	-2,171.10	-211.29	2,024.82	7.69	168.90
89	13317	90.96	172.42	11,547.58	-2,260.59	-201.90	2,113.35	3.60	169
90	13407	90.94	169.34	11,546.09	-2,349.43	-187.64	2,202.63	3.42	162.30
91	13497	88.76	159.27	11,546.33	-2,435.96	-163.33	2,292.50	11.45	167.50
92	13586	90.79	164.63	11,546.68	-2,520.54	-135.76	2,381.42	6.44	171.10
93	13676	91.40	165.02	11,544.96	-2,607.39	-112.21	2,471.39	0.80	168.40
94	13766	90.07	163.06	11,543.80	-2,693.91	-87.46	2,561.37	2.63	162.30
95	13856	90.80	161.89	11,543.12	-2,779.73	-60.36	2,651.35	1.53	170.20
96	13946	90.50	163.86	11,542.10	-2,865.73	-33.87	2,741.33	2.21	174.60
97	14035	90.21	165.33	11,541.55	-2,951.52	-10.23	2,830.31	1.68	176.40
98	14125	91.19	164.65	11,540.45	-3,038.44	13.08	2,920.28	1.33	174.60
99	14215	91.16	161.64	11,538.60	-3,124.55	39.17	3,010.25	3.34	178.10
100	14304	90.15	162.51	11,537.58	-3,209.22	66.56	3,099.20	1.50	180.80
101	14394	90.12	164.71	11,537.37	-3,295.56	91.95	3,189.20	2.44	181.60
102	14484	90.23	165.85	11,537.10	-3,382.60	114.82	3,279.16	1.27	181.30
103	14574	90.42	168.45	11,536.59	-3,470.34	134.83	3,368.99	2.90	183.40
104	14663	90.46	166.46	11,535.90	-3,557.21	154.16	3,457.79	2.24	179.50
105	14753	89.84	166.29	11,535.67	-3,644.68	175.36	3,547.70	0.71	183.10
106	14843	88.95	162.70	11,536.62	-3,731.38	199.42	3,637.67	4.11	185.20
107	14933	88.86	163.35	11,538.34	-3,817.44	225.69	3,727.64	0.73	183.40
108	15023	90.54	167.73	11,538.81	-3,904.57	248.15	3,817.57	5.21	185.20
109	15113	90.81	164.06	11,537.75	-3,991.83	270.08	3,907.49	4.09	177.80
110	15202	89.68	161.32	11,537.37	-4,076.79	296.56	3,996.46	3.33	181.30
111	15292	89.53	162.94	11,537.99	-4,162.44	324.18	4,086.42	1.81	183.10
112	15382	89.65	164.96	11,538.63	-4,248.93	349.06	4,176.41	2.25	181.30
113	15472	89.86	163.26	11,539.02	-4,335.49	373.70	4,266.41	1.90	177.20
114	15562	88.53	157.05	11,540.28	-4,420.09	404.23	4,356.18	7.06	184.30
115	15651	89.14	159.22	11,542.09	-4,502.67	437.37	4,444.73	2.53	186.60
116	15741	90.11	164.18	11,542.68	-4,588.09	465.62	4,534.64	5.62	188.70
117	15831	90.16	164.51	11,542.47	-4,674.75	489.90	4,624.64	0.37	190.10
118	15921	89.94	166.55	11,542.39	-4,761.89	512.39	4,714.59	2.28	192.20
119	16011	90.15	165.86	11,542.32	-4,849.29	533.85	4,804.50	0.80	186
120	16100	90.55	165.42	11,541.78	-4,935.51	555.92	4,893.45	0.67	186.90
121	16190	91.06	162.51	11,540.51	-5,021.99	580.78	4,983.43	3.28	188.40
122	16280	89.80	158.53	11,539.84	-5,106.81	610.78	5,073.27	4.64	191.30
123	16370	89.76	159.56	11,540.18	-5,190.86	642.97	5,162.97	1.15	194.80

Svy	Depth	Inc	Azm	TVD	NS	EW	VS	DLS	Temp
124	16460	90.83	163.05	11,539.72	-5,276.10	671.81	5,252.87	4.06	197.20
125	16550	89.32	158.19	11,539.60	-5,360.97	701.67	5,342.71	5.65	197.20
126	16639	90.05	157.10	11,540.09	-5,443.28	735.52	5,431.21	1.47	195.70
127	16729	88.72	156.29	11,541.06	-5,525.93	771.12	5,520.52	1.73	195.40
128	16819	89.45	159.67	11,542.49	-5,609.34	804.85	5,610.05	3.84	195.40
129	16909	89.14	161.46	11,543.60	-5,694.20	834.80	5,699.90	2.02	195.40
130	16998	90.03	165.35	11,544.25	-5,779.47	860.21	5,788.88	4.48	197.20
131	17088	90.20	167.80	11,544.07	-5,867.01	881.10	5,878.76	2.73	198.90
132	17178	91.03	164.15	11,543.10	-5,954.30	902.91	5,968.67	4.16	194
133	17268	90.45	163.08	11,541.94	-6,040.64	928.29	6,058.66	1.35	198.40
134	17358	89.22	162.62	11,542.20	-6,126.64	954.83	6,148.65	1.46	201.10
135	17448	89.89	165.69	11,542.90	-6,213.20	979.40	6,238.63	3.49	199.20
136	17537	89.86	164.96	11,543.09	-6,299.30	1,001.95	6,327.59	0.82	188.70
137	17627	89.09	163.17	11,543.91	-6,385.83	1,026.66	6,417.59	2.17	195.70
138	17717	90.59	166.94	11,544.17	-6,472.77	1,049.86	6,507.54	4.51	197.20
139	17807	89.94	163.18	11,543.75	-6,559.71	1,073.06	6,597.50	4.24	195.40
140	17897	90.19	161.01	11,543.65	-6,645.35	1,100.73	6,687.46	2.43	200.70
141	17986	88.64	159.77	11,544.56	-6,729.18	1,130.59	6,776.30	2.23	202.50
142	18076	89.44	161.81	11,546.06	-6,814.15	1,160.20	6,866.16	2.43	204.50
143	18166	88.94	163.05	11,547.34	-6,899.94	1,187.37	6,956.13	1.49	202.50
144	18255	89.45	165.18	11,548.59	-6,985.53	1,211.72	7,045.11	2.46	193.10
145	18345	90.02	162.89	11,549.00	-7,072.05	1,236.47	7,135.10	2.62	197.50
146	18435	89.35	160.41	11,549.50	-7,157.46	1,264.80	7,225.04	2.85	201.90
147	18525	89.53	163.19	11,550.38	-7,242.95	1,292.91	7,314.97	3.10	204.50
148	18615	89.74	166.09	11,550.95	-7,329.72	1,316.75	7,404.95	3.23	207.80
149	18704	89.60	164.69	11,551.46	-7,415.84	1,339.20	7,493.91	1.58	201
150	18794	90.47	164.38	11,551.41	-7,502.58	1,363.19	7,583.90	1.03	203.70
151	18884	89.74	162.76	11,551.24	-7,588.90	1,388.65	7,673.89	1.97	206.30
152	18974	90.05	162.76	11,551.41	-7,674.86	1,415.32	7,763.88	0.34	208.10
153	19064	90.85	164.05	11,550.70	-7,761.10	1,441.03	7,853.87	1.69	209.80
154	19153	91.44	165.71	11,548.92	-7,847.00	1,464.23	7,942.83	1.98	208.90
155	19243	89.09	161.83	11,548.51	-7,933.39	1,489.38	8,032.81	5.04	211.60
156	19333	90.30	164.45	11,548.99	-8,019.51	1,515.48	8,122.79	3.21	210.70
157	19423	89.68	163.68	11,549.00	-8,106.05	1,540.19	8,212.79	1.10	210.70
158	19513	89.81	164.61	11,549.40	-8,192.63	1,564.78	8,302.79	1.04	209.80
159	19523	89.38	163.78	11,549.47	-8,202.25	1,567.50	8,312.79	9.35	203.70
PTB	19580	89.38	163.78	11,550.09	-8,256.98	1,583.42	8,369.78	0	0

363 N Sam Houston Pky East Suite 300
Houston, TX 77060

Railroad Commission of Texas
Oil and Gas Division
P.O.Box 12967
Capitol Station
Austin TX, 78711

September 5, 2017

Attn: Pam Johns

Enclosed, please find the original and one copy of the surveys performed on the referenced well by Premier Directional Drilling, LLC (Operator No. 676020) supervised by Ralph Clarke. Other information required by your office is as follows:

JOB NUMBER	M17030	CUSTOMER	Shell Western E&P
WELL NAME	University 19 PW Unit 1503H	COUNTY & STATE	Loving County, Texas
API WELL NUMBER	42301331700000	PROPOSED DIRECTION	163.72

TIE-IN DATA						
MEASURED DEPTH	VERTICAL DEPTH	INCLINATION	AZIMUTH	N-S	E-W	DATA SOURCE
ft	.00 ft	.0 ft	.0 ft	.00 ft	.00 ft	(Surface)

FIRST SURVEY DATE	FIRST SURVEY DEPTH	INCLINATION	AZIMUTH
01/29/17	185 ft	.87°	218.13°

SURVEY INSTRUMENT TYPE
Premier MWD

LAST SURVEY DATE	LAST SURVEY DEPTH	INCLINATION	AZIMUTH
03/10/17	19,523 ft	89.38°	163.78°

TO THE BEST OF MY KNOWLEDGE I CERTIFY THIS SURVEY DATA TO BE TRUE AND CORRECT.

PROJECTED TD SURVEY DATE	PROJECTED TD SURVEY DEPTH	INCLINATION	AZIMUTH
03/10/17	19,580 ft	89.38°	163.78°

Todd Voss

Todd Voss
MWD Manager
Premier Directional Drilling, LLC

TOTAL CORRECTION USED	8.75
DECLINATION OR GRID	GRID

MWD SUPERVISOR 1	John Gutentag	DIRECTIONAL DRILLER 1	Corey Austin
MWD SUPERVISOR 2	Jeff Brokaw	DIRECTIONAL DRILLER 2	Martin Farr

A certified plat on which the bottom-hole location is oriented to the surface location is attached to the survey report. If any other information is required, please contact the undersigned at the letterhead address and phone number.

Enclosures (Surveys and Plat)

SHELL WESTERN E&P

WELL LOCATION

LEASE NAME & WELL NO.:

UNIVERSITY 19 PW UNIT 1503H

UNIT/LEASE ACREAGE:

8588.11 ACRES

NEAREST TOWN IN COUNTY:

±9.7 MILES SOUTHEAST OF MENTONE, TEXAS

DESCRIPTION:

SECTIONS 15 & 17, BLOCK 19, UNIVERSITY LAND SURVEY
LOVING COUNTY, TEXAS

This location and/or unit/lease boundary has been carefully surveyed on the ground under my supervision and is true and correct to the best of my knowledge according to the evidence, official survey records, maps, and other data provided by Shell Western E&P. This plat was created for the sole purpose of filing a permit with the Railroad Commission of Texas and should not be construed as a "Boundary Survey" in compliance with T.B.P.L.S. Minimum Standards of Procedures for Boundary Surveys. This certification if made and limited to those persons or entities shown on the face of this plat is non-transferable. This Survey is Certified for this transaction only.
Survey date of October 26, 2016.

STATE OF TEXAS
REGISTERED
JOHN R. ANDERSON
6442
PROFESSIONAL
LAND SURVEYOR

11/22/16

John R. Anderson, R.P.L.S. No. 6442

I, John R. Anderson, a Registered Professional Land Surveyor, and an authorized agent of Topographic Land Surveyors, do hereby certify that the above described well location was surveyed on the ground as shown herein. This plat is for Texas Railroad Commission permitting only.

ALL BEARINGS, DISTANCES, AND COORDINATE VALUES CONTAINED HEREON ARE GRID BASED UPON THE TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE OF THE NORTH AMERICAN DATUM 1927, U.S. SURVEY FEET
ALL ELEVATION VALUES CONTAINED HEREON ARE ORTHOMETRIC ONLY, BASED UPON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), U.S. SURVEY FEET.
ALL INSTRUMENTS, PRE/POST DRILLING DATA, PRE/POST COMPLETION DATA, HARD LINE INFORMATION, LEASE INFORMATION, AND ANY PERTINENT INFORMATION USED IN THE PREPARATION OF THIS MAP WAS PROVIDED BY SHELL WESTERN E&P OR ITS SUBSIDIARIES & AFFILIATES.

ORIGINAL DOC. SIZE: 8.5"x14"

TOPOGRAPHIC
LOYALTY INNOVATION LEGACY
1400 EVERMAN PARKWAY, Ste. 197 • FT. WORTH, TEXAS 76140
TELEPHONE: (817) 744-7512 • FAX (817) 744-7548
TEXAS FIRM REGISTRATION NO. 10042504
WWW.TOPOGRAPHIC.COM

DATE:	11/22/2016
DRAWN BY:	O.M.
LO_UNIVERSITY_19_PW_UNIT_1503H	
SHEET:	1 OF 1

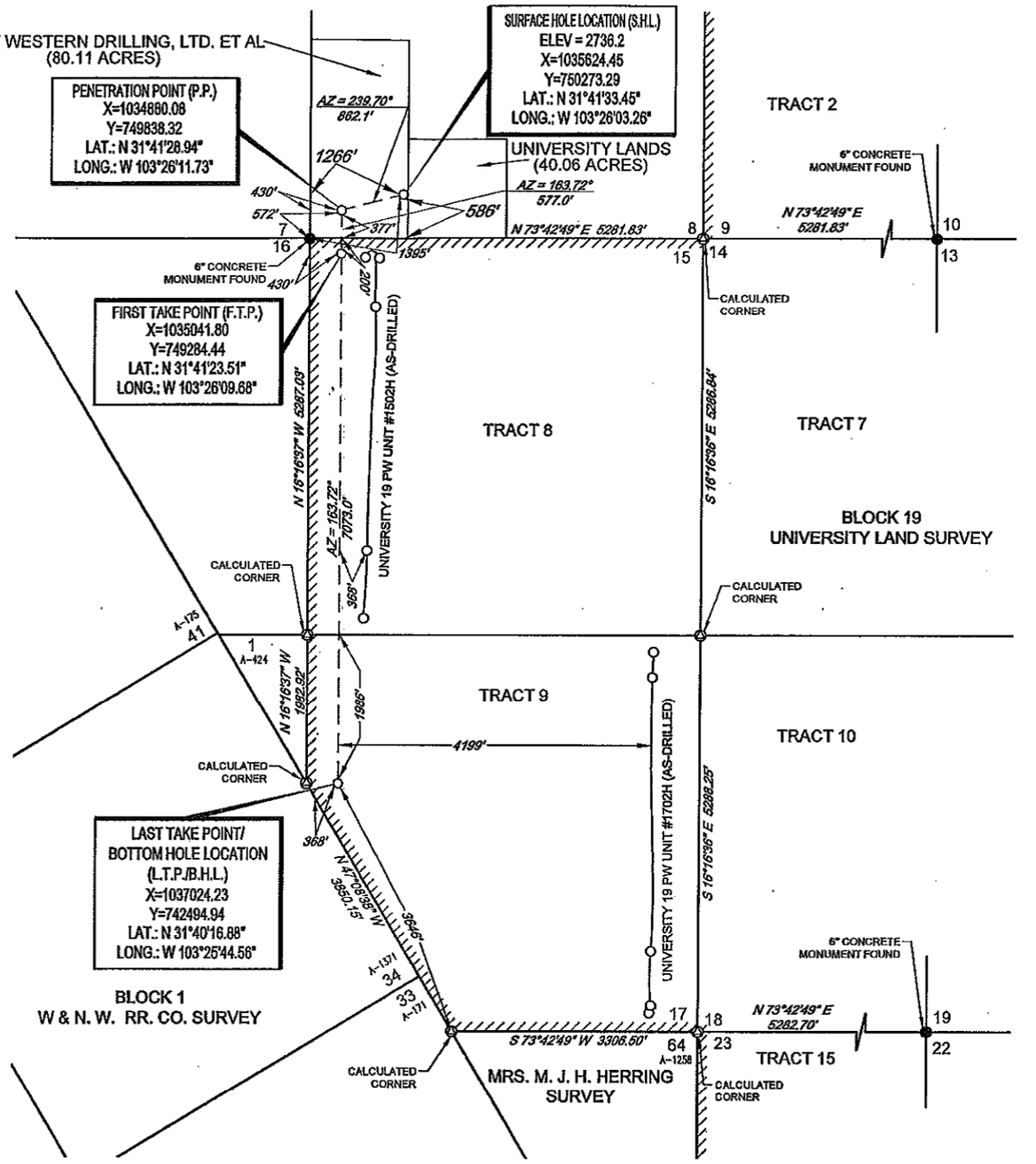
REV# BY	DATE REVISED

NAD 27
GRID BEARINGS
SCALE: 1" = 2000'
0' 1000' 2000'

TIES TABLE

POINT	UNIT	SURVEY/SECTION
S.H.L.	586' FNWL	1266' FSWL &
	1395' FWC	588' FSEL
P.P.	377' FNWL	430' FSWL &
	572' FWC	377' FSEL
F.T.P.	200' FNWL	200' FNWL &
	430' FSWL	430' FSWL
L.T.P. / B.H.L.	368' FSWL	1986' FNWL &
	3646' FSC	368' FSWL

LEGEND:
- Unit Boundary
- Survey/Section line
- Proposed Well Path
- Existing/Permitted Well Path
- Mineral Tract Boundary
- Monument Found
- Calculated Corner
- Well Point



363 N Sam Houston Pky East Suite 300
Houston, TX 77060

September 5, 2017

State of Texas

County of Harris

I, Todd Voss, certify that; I am employed by Premier Directional Drilling, LLC; that on the day(s) of January 29, 2017 – March 10, 2017 we conducted and/or supervised the taking of MWD surveys for University 19 PW Unit 1503H from a depth of 185.00 feet to a depth of 19,580.00 feet; that the data is true, correct, complete, and within the limitations of the tool as set forth by Premier Directional Drilling, LLC; that I am authorized and qualified to make this report; that this survey was conducted accordingly at the request of Shell Western E&P; that I reviewed this report and find it conforms to the principles and procedures as set forth by Premier Directional Drilling, LLC.

Todd Voss

Todd Voss
MWD Manager
Premier Directionaldrilling, LLC