

# **MALLARD EXPLORATION**

**WELD COUNTY**

**SEC 30-T8N-R60W**

**GADWALL 30-31-4HN**

**OWB**

**Plan: PROPOSAL 1**

## **Standard Planning Report**

**19 May, 2022**



Project: WELD COUNTY  
Site: SEC 30-T8N-R60W  
Well: GADWALL 30-31-4HN  
Wellbore: OWB  
Design: PROPOSAL 1

PROJECT DETAILS: WELD COUNTY  
Geodetic System: US State Plane 1983  
Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone: Colorado Northern Zone  
System Datum: Mean Sea Level



Azimuths to True North  
Magnetic North: 7.44°  
Magnetic Field  
Strength: 52043.7nT  
Dip Angle: 66.89°  
Date: 5/16/2022  
Model: IGRF2020

#### WELL DETAILS: GADWALL 30-31-4HN

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	1478346.72	3379317.95	40.638433°N	104.133186°W	

#### SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	
3	1181.34	9.63	300.50	1179.08	20.47	-34.76	2.00	300.50	-16.96	
4	5836.07	9.63	300.50	5768.26	415.52	-705.48	0.00	0.00	-344.13	
5	6783.54	90.00	180.84	6382.00	-154.08	-804.29	10.00	-119.31	232.43	LP-GADWELL 4HN
6	16157.34	90.00	180.84	6382.00	-9526.88	-941.47	0.00	0.00	9573.28	PBHL-GADWELL 4HN

#### FORMATION TOP DETAILS

TVDPath	MDPath	Formation
165.00	165.00	*Laramie Base
610.00	610.00	*Laramie Fox Hills Base
915.00	915.20	*Pierre Shale Base
1700.00	1709.70	*Upper Pierre Shale Base (SFC min depth)
3402.00	3436.01	Richard Sandstone
3522.00	3557.73	Parkman Sandstone
3882.00	3922.87	Parkman Sandstone Base
6187.00	6293.48	Sharon Springs
6227.00	6349.52	Niobrara Top
6367.00	6651.43	Niobrara B2 Chalk Top
6377.00	6707.38	Niobrara B2 Chalk Target Top
6382.00	6783.54	Niobrara B2 Chalk Landing Point

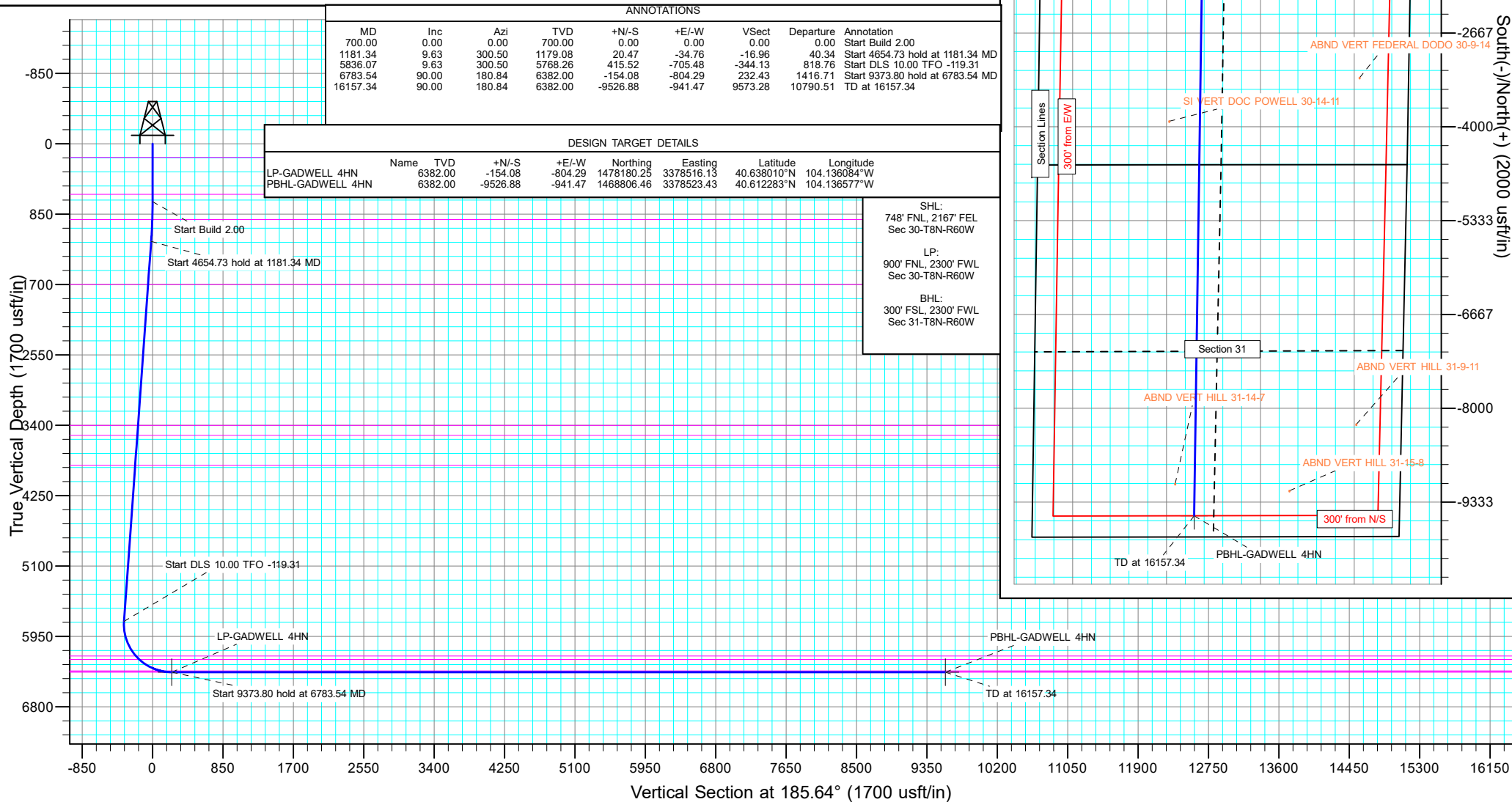
#### ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Departure	Annotation
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	Start Build 2.00
1181.34	9.63	300.50	1179.08	20.47	-34.76	-16.96	40.34	Start 4654.73 hold at 1181.34 MD
5836.07	9.63	300.50	5768.26	415.52	-705.48	-344.13	818.76	Start DLS 10.00 TFO -119.31
6783.54	90.00	180.84	6382.00	-154.08	-804.29	232.43	1416.71	Start 9373.80 hold at 6783.54 MD
16157.34	90.00	180.84	6382.00	-9526.88	-941.47	9573.28	10790.51	TD at 16157.34

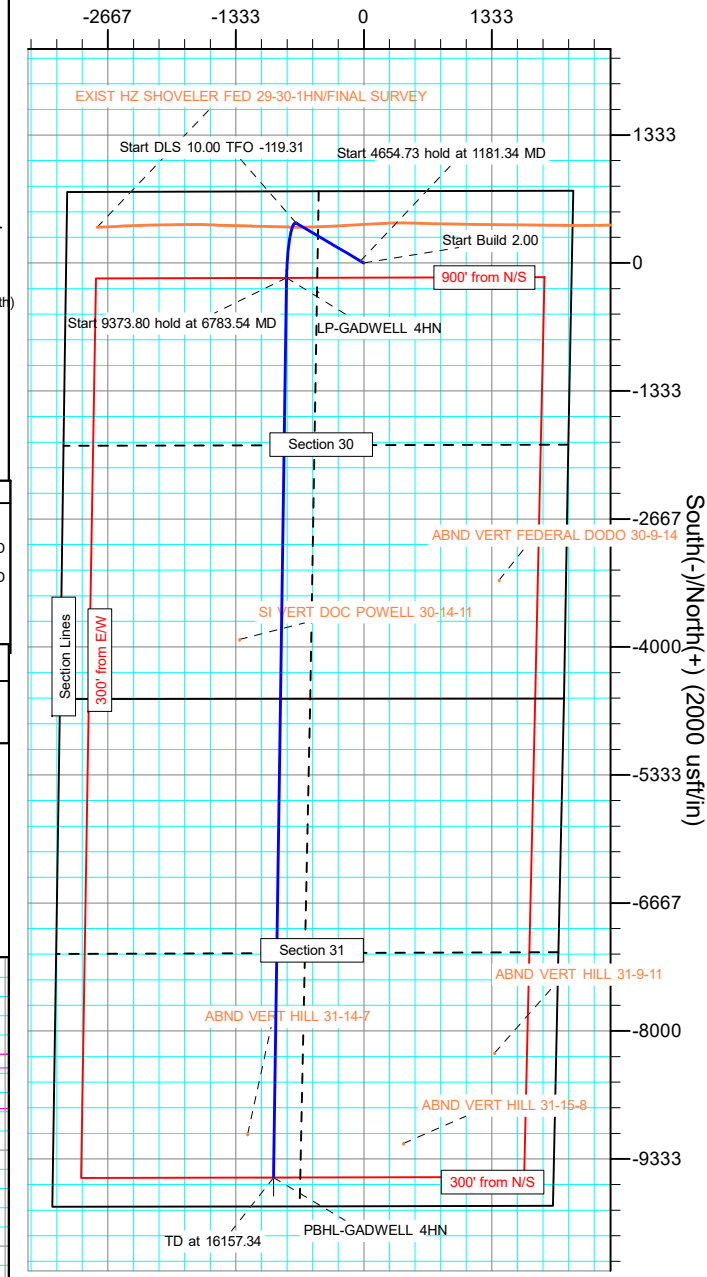
#### DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
LP-GADWELL 4HN	6382.00	-154.08	-804.29	1478180.25	3378516.13	40.638010°N	104.136084°W
PBHL-GADWELL 4HN	6382.00	-9526.88	-941.47	1468806.46	3378523.43	40.612283°N	104.136577°W

SHL:  
748' FNL, 2167' FEL  
Sec 30-T8N-R60W  
LP:  
900' FNL, 2300' FWL  
Sec 30-T8N-R60W  
BHL:  
300' FSL, 2300' FWL  
Sec 31-T8N-R60W



#### West(-)/East(+) (2000 usft/in)



## Planning Report

<b>Database:</b>	EDM 5000.16 Single User Db	<b>Local Co-ordinate Reference:</b>	Well GADWALL 30-31-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB 27' @ 4977.00usft
<b>Project:</b>	WELD COUNTY	<b>MD Reference:</b>	KB 27' @ 4977.00usft
<b>Site:</b>	SEC 30-T8N-R60W	<b>North Reference:</b>	True
<b>Well:</b>	GADWALL 30-31-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	PROPOSAL 1		

<b>Project</b>	WELD COUNTY		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

Site		SEC 30-T8N-R60W			
Site Position:		Northing:	1,479,134.50 usft	Latitude:	40.640503°N
From:	Lat/Long	Easting:	3,381,487.66 usft	Longitude:	104.125325°W
Position Uncertainty:	0.00 usft	Slot Radius:	13.200 in		

Well		GADWALL 30-31-4HN				
Well Position	+N/-S	0.00 usft	Northing:	1,478,346.72 usft	Latitude:	40.638433°N
	+E/-W	0.00 usft	Easting:	3,379,317.94 usft	Longitude:	104.133186°W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	4,950.00 usft
Grid Convergence:		0.88 °				

<b>Wellbore</b>	OWB				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2020	5/16/2022	7.44	66.89	52,043.74276472

<b>Design</b>	PROPOSAL 1				
<b>Audit Notes:</b>					
<b>Version:</b>		<b>Phase:</b>	PROTOTYPE	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>		<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
		0.00	0.00	0.00	185.64

<b>Plan Survey Tool Program</b>	<b>Date</b>	5/19/2022			
<b>Depth From (usft)</b>	<b>Depth To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>	
1	0.00	16,157.34 PROPOSAL 1 (OWB)	MWD		
			OWSG MWD - Standard		

<b>Plan Sections</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>	<b>TFO (°)</b>	<b>Target</b>
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,181.34	9.63	300.50	1,179.08	20.47	-34.76	2.00	2.00	0.00	300.50	
5,836.07	9.63	300.50	5,768.26	415.52	-705.48	0.00	0.00	0.00	0.00	
6,783.54	90.00	180.84	6,382.00	-154.08	-804.29	10.00	8.48	-12.63	-119.31	LP-GADWELL 4HN
16,157.34	90.00	180.84	6,382.00	-9,526.88	-941.47	0.00	0.00	0.00	0.00	PBHL-GADWELL 4HI

# Planning Report

<b>Database:</b>	EDM 5000.16 Single User Db	<b>Local Co-ordinate Reference:</b>	Well GADWALL 30-31-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB 27' @ 4977.00usft
<b>Project:</b>	WELD COUNTY	<b>MD Reference:</b>	KB 27' @ 4977.00usft
<b>Site:</b>	SEC 30-T8N-R60W	<b>North Reference:</b>	True
<b>Well:</b>	GADWALL 30-31-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	PROPOSAL 1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
165.00	0.00	0.00	165.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>*Laramie Base</b>									
610.00	0.00	0.00	610.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>*Laramie Fox Hills Base</b>									
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Start Build 2.00</b>									
800.00	2.00	300.50	799.98	0.89	-1.50	-0.73	2.00	2.00	0.00
900.00	4.00	300.50	899.84	3.54	-6.01	-2.93	2.00	2.00	0.00
915.20	4.30	300.50	915.00	4.10	-6.96	-3.40	2.00	2.00	0.00
<b>*Pierre Shale Base</b>									
1,000.00	6.00	300.50	999.45	7.96	-13.52	-6.60	2.00	2.00	0.00
1,100.00	8.00	300.50	1,098.70	14.15	-24.02	-11.72	2.00	2.00	0.00
1,181.34	9.63	300.50	1,179.08	20.47	-34.76	-16.96	2.00	2.00	0.00
<b>Start 4654.73 hold at 1181.34 MD</b>									
1,200.00	9.63	300.50	1,197.48	22.06	-37.45	-18.27	0.00	0.00	0.00
1,300.00	9.63	300.50	1,296.07	30.54	-51.86	-25.30	0.00	0.00	0.00
1,400.00	9.63	300.50	1,394.66	39.03	-66.27	-32.33	0.00	0.00	0.00
1,500.00	9.63	300.50	1,493.25	47.52	-80.68	-39.35	0.00	0.00	0.00
1,600.00	9.63	300.50	1,591.84	56.01	-95.09	-46.38	0.00	0.00	0.00
1,700.00	9.63	300.50	1,690.43	64.49	-109.50	-53.41	0.00	0.00	0.00
1,709.70	9.63	300.50	1,700.00	65.32	-110.89	-54.09	0.00	0.00	0.00
<b>*Upper Pierre Shale Base (SFC min depth)</b>									
1,800.00	9.63	300.50	1,789.03	72.98	-123.91	-60.44	0.00	0.00	0.00
1,900.00	9.63	300.50	1,887.62	81.47	-138.32	-67.47	0.00	0.00	0.00
2,000.00	9.63	300.50	1,986.21	89.95	-152.72	-74.50	0.00	0.00	0.00
2,100.00	9.63	300.50	2,084.80	98.44	-167.13	-81.53	0.00	0.00	0.00
2,200.00	9.63	300.50	2,183.39	106.93	-181.54	-88.56	0.00	0.00	0.00
2,300.00	9.63	300.50	2,281.99	115.42	-195.95	-95.59	0.00	0.00	0.00
2,400.00	9.63	300.50	2,380.58	123.90	-210.36	-102.61	0.00	0.00	0.00
2,500.00	9.63	300.50	2,479.17	132.39	-224.77	-109.64	0.00	0.00	0.00
2,600.00	9.63	300.50	2,577.76	140.88	-239.18	-116.67	0.00	0.00	0.00
2,700.00	9.63	300.50	2,676.35	149.36	-253.59	-123.70	0.00	0.00	0.00
2,800.00	9.63	300.50	2,774.94	157.85	-268.00	-130.73	0.00	0.00	0.00
2,900.00	9.63	300.50	2,873.54	166.34	-282.41	-137.76	0.00	0.00	0.00
3,000.00	9.63	300.50	2,972.13	174.83	-296.82	-144.79	0.00	0.00	0.00
3,100.00	9.63	300.50	3,070.72	183.31	-311.23	-151.82	0.00	0.00	0.00
3,200.00	9.63	300.50	3,169.31	191.80	-325.64	-158.85	0.00	0.00	0.00
3,300.00	9.63	300.50	3,267.90	200.29	-340.05	-165.87	0.00	0.00	0.00
3,400.00	9.63	300.50	3,366.49	208.77	-354.46	-172.90	0.00	0.00	0.00
3,436.01	9.63	300.50	3,402.00	211.83	-359.65	-175.43	0.00	0.00	0.00
<b>Richard Sandstone</b>									
3,500.00	9.63	300.50	3,465.09	217.26	-368.87	-179.93	0.00	0.00	0.00
3,557.73	9.63	300.50	3,522.00	222.16	-377.18	-183.99	0.00	0.00	0.00
<b>Parkman Sandstone</b>									
3,600.00	9.63	300.50	3,563.68	225.75	-383.28	-186.96	0.00	0.00	0.00
3,700.00	9.63	300.50	3,662.27	234.23	-397.68	-193.99	0.00	0.00	0.00
3,800.00	9.63	300.50	3,760.86	242.72	-412.09	-201.02	0.00	0.00	0.00
3,900.00	9.63	300.50	3,859.45	251.21	-426.50	-208.05	0.00	0.00	0.00
3,922.87	9.63	300.50	3,882.00	253.15	-429.80	-209.65	0.00	0.00	0.00
<b>Parkman Sandstone Base</b>									
4,000.00	9.63	300.50	3,958.05	259.70	-440.91	-215.08	0.00	0.00	0.00
4,100.00	9.63	300.50	4,056.64	268.18	-455.32	-222.10	0.00	0.00	0.00

# Planning Report

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<b>Project:</b>	WELD COUNTY	<b>MD Reference:</b>	KB 27' @ 4977.00usft
<b>Site:</b>	SEC 30-T8N-R60W	<b>North Reference:</b>	True
<b>Well:</b>	GADWALL 30-31-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	PROPOSAL 1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
4,200.00	9.63	300.50	4,155.23	276.67	-469.73	-229.13	0.00	0.00	0.00	
4,300.00	9.63	300.50	4,253.82	285.16	-484.14	-236.16	0.00	0.00	0.00	
4,400.00	9.63	300.50	4,352.41	293.64	-498.55	-243.19	0.00	0.00	0.00	
4,500.00	9.63	300.50	4,451.00	302.13	-512.96	-250.22	0.00	0.00	0.00	
4,600.00	9.63	300.50	4,549.60	310.62	-527.37	-257.25	0.00	0.00	0.00	
4,700.00	9.63	300.50	4,648.19	319.11	-541.78	-264.28	0.00	0.00	0.00	
4,800.00	9.63	300.50	4,746.78	327.59	-556.19	-271.31	0.00	0.00	0.00	
4,900.00	9.63	300.50	4,845.37	336.08	-570.60	-278.34	0.00	0.00	0.00	
5,000.00	9.63	300.50	4,943.96	344.57	-585.01	-285.36	0.00	0.00	0.00	
5,100.00	9.63	300.50	5,042.56	353.05	-599.42	-292.39	0.00	0.00	0.00	
5,200.00	9.63	300.50	5,141.15	361.54	-613.83	-299.42	0.00	0.00	0.00	
5,300.00	9.63	300.50	5,239.74	370.03	-628.24	-306.45	0.00	0.00	0.00	
5,400.00	9.63	300.50	5,338.33	378.51	-642.64	-313.48	0.00	0.00	0.00	
5,500.00	9.63	300.50	5,436.92	387.00	-657.05	-320.51	0.00	0.00	0.00	
5,600.00	9.63	300.50	5,535.51	395.49	-671.46	-327.54	0.00	0.00	0.00	
5,700.00	9.63	300.50	5,634.11	403.98	-685.87	-334.57	0.00	0.00	0.00	
5,800.00	9.63	300.50	5,732.70	412.46	-700.28	-341.60	0.00	0.00	0.00	
5,836.07	9.63	300.50	5,768.26	415.52	-705.48	-344.13	0.00	0.00	0.00	
Start DLS 10.00 TFO -119.31										
5,900.00	8.54	259.69	5,831.45	417.39	-714.77	-345.07	10.00	-1.69	-63.83	
6,000.00	14.32	216.12	5,929.59	406.04	-729.40	-332.34	10.00	5.77	-43.57	
6,100.00	23.14	201.01	6,024.26	377.64	-743.77	-302.67	10.00	8.82	-15.10	
6,200.00	32.63	194.15	6,112.57	333.05	-757.44	-256.94	10.00	9.49	-6.86	
6,293.48	41.69	190.36	6,187.00	277.91	-769.22	-200.91	10.00	9.70	-4.05	
Sharon Springs										
6,300.00	42.33	190.15	6,191.84	273.61	-770.00	-196.56	10.00	9.76	-3.26	
6,349.52	47.17	188.69	6,227.00	239.23	-775.68	-161.78	10.00	9.78	-2.95	
Niobrara Top										
6,400.00	52.13	187.42	6,259.67	201.15	-781.06	-123.36	10.00	9.81	-2.52	
6,500.00	61.98	185.34	6,314.00	117.85	-790.28	-39.56	10.00	9.85	-2.08	
6,600.00	71.85	183.61	6,353.17	26.25	-797.40	52.30	10.00	9.87	-1.73	
6,651.43	76.93	182.80	6,367.00	-23.19	-800.16	101.77	10.00	9.88	-1.57	
Niobrara B2 Chalk Top										
6,700.00	81.74	182.07	6,375.99	-70.86	-802.18	149.41	10.00	9.89	-1.51	
6,707.38	82.47	181.96	6,377.00	-78.17	-802.44	156.70	10.00	9.89	-1.49	
Niobrara B2 Chalk Target Top										
6,783.54	90.00	180.84	6,382.00	-154.08	-804.29	232.43	10.00	9.89	-1.47	
Start 9373.80 hold at 6783.54 MD - Niobrara B2 Chalk Landing Point										
6,800.00	90.00	180.84	6,382.00	-170.54	-804.53	248.84	0.00	0.00	0.00	
6,900.00	90.00	180.84	6,382.00	-270.53	-805.99	348.48	0.00	0.00	0.00	
7,000.00	90.00	180.84	6,382.00	-370.52	-807.46	448.13	0.00	0.00	0.00	
7,100.00	90.00	180.84	6,382.00	-470.51	-808.92	547.78	0.00	0.00	0.00	
7,200.00	90.00	180.84	6,382.00	-570.50	-810.38	647.43	0.00	0.00	0.00	
7,300.00	90.00	180.84	6,382.00	-670.49	-811.85	747.08	0.00	0.00	0.00	
7,400.00	90.00	180.84	6,382.00	-770.48	-813.31	846.73	0.00	0.00	0.00	
7,500.00	90.00	180.84	6,382.00	-870.47	-814.77	946.38	0.00	0.00	0.00	
7,600.00	90.00	180.84	6,382.00	-970.46	-816.24	1,046.02	0.00	0.00	0.00	
7,700.00	90.00	180.84	6,382.00	-1,070.45	-817.70	1,145.67	0.00	0.00	0.00	
7,800.00	90.00	180.84	6,382.00	-1,170.44	-819.16	1,245.32	0.00	0.00	0.00	
7,900.00	90.00	180.84	6,382.00	-1,270.42	-820.63	1,344.97	0.00	0.00	0.00	
8,000.00	90.00	180.84	6,382.00	-1,370.41	-822.09	1,444.62	0.00	0.00	0.00	
8,100.00	90.00	180.84	6,382.00	-1,470.40	-823.56	1,544.27	0.00	0.00	0.00	
8,200.00	90.00	180.84	6,382.00	-1,570.39	-825.02	1,643.92	0.00	0.00	0.00	

# Planning Report

<b>Database:</b>	EDM 5000.16 Single User Db	<b>Local Co-ordinate Reference:</b>	Well GADWALL 30-31-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB 27' @ 4977.00usft
<b>Project:</b>	WELD COUNTY	<b>MD Reference:</b>	KB 27' @ 4977.00usft
<b>Site:</b>	SEC 30-T8N-R60W	<b>North Reference:</b>	True
<b>Well:</b>	GADWALL 30-31-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	PROPOSAL 1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
8,300.00	90.00	180.84	6,382.00	-1,670.38	-826.48	1,743.56	0.00	0.00	0.00	
8,400.00	90.00	180.84	6,382.00	-1,770.37	-827.95	1,843.21	0.00	0.00	0.00	
8,500.00	90.00	180.84	6,382.00	-1,870.36	-829.41	1,942.86	0.00	0.00	0.00	
8,600.00	90.00	180.84	6,382.00	-1,970.35	-830.87	2,042.51	0.00	0.00	0.00	
8,700.00	90.00	180.84	6,382.00	-2,070.34	-832.34	2,142.16	0.00	0.00	0.00	
8,800.00	90.00	180.84	6,382.00	-2,170.33	-833.80	2,241.81	0.00	0.00	0.00	
8,900.00	90.00	180.84	6,382.00	-2,270.32	-835.26	2,341.46	0.00	0.00	0.00	
9,000.00	90.00	180.84	6,382.00	-2,370.31	-836.73	2,441.10	0.00	0.00	0.00	
9,100.00	90.00	180.84	6,382.00	-2,470.30	-838.19	2,540.75	0.00	0.00	0.00	
9,200.00	90.00	180.84	6,382.00	-2,570.29	-839.65	2,640.40	0.00	0.00	0.00	
9,300.00	90.00	180.84	6,382.00	-2,670.27	-841.12	2,740.05	0.00	0.00	0.00	
9,400.00	90.00	180.84	6,382.00	-2,770.26	-842.58	2,839.70	0.00	0.00	0.00	
9,500.00	90.00	180.84	6,382.00	-2,870.25	-844.04	2,939.35	0.00	0.00	0.00	
9,600.00	90.00	180.84	6,382.00	-2,970.24	-845.51	3,038.99	0.00	0.00	0.00	
9,700.00	90.00	180.84	6,382.00	-3,070.23	-846.97	3,138.64	0.00	0.00	0.00	
9,800.00	90.00	180.84	6,382.00	-3,170.22	-848.43	3,238.29	0.00	0.00	0.00	
9,900.00	90.00	180.84	6,382.00	-3,270.21	-849.90	3,337.94	0.00	0.00	0.00	
10,000.00	90.00	180.84	6,382.00	-3,370.20	-851.36	3,437.59	0.00	0.00	0.00	
10,100.00	90.00	180.84	6,382.00	-3,470.19	-852.82	3,537.24	0.00	0.00	0.00	
10,200.00	90.00	180.84	6,382.00	-3,570.18	-854.29	3,636.89	0.00	0.00	0.00	
10,300.00	90.00	180.84	6,382.00	-3,670.17	-855.75	3,736.53	0.00	0.00	0.00	
10,400.00	90.00	180.84	6,382.00	-3,770.16	-857.21	3,836.18	0.00	0.00	0.00	
10,500.00	90.00	180.84	6,382.00	-3,870.15	-858.68	3,935.83	0.00	0.00	0.00	
10,600.00	90.00	180.84	6,382.00	-3,970.14	-860.14	4,035.48	0.00	0.00	0.00	
10,700.00	90.00	180.84	6,382.00	-4,070.12	-861.61	4,135.13	0.00	0.00	0.00	
10,800.00	90.00	180.84	6,382.00	-4,170.11	-863.07	4,234.78	0.00	0.00	0.00	
10,900.00	90.00	180.84	6,382.00	-4,270.10	-864.53	4,334.43	0.00	0.00	0.00	
11,000.00	90.00	180.84	6,382.00	-4,370.09	-866.00	4,434.07	0.00	0.00	0.00	
11,100.00	90.00	180.84	6,382.00	-4,470.08	-867.46	4,533.72	0.00	0.00	0.00	
11,200.00	90.00	180.84	6,382.00	-4,570.07	-868.92	4,633.37	0.00	0.00	0.00	
11,300.00	90.00	180.84	6,382.00	-4,670.06	-870.39	4,733.02	0.00	0.00	0.00	
11,400.00	90.00	180.84	6,382.00	-4,770.05	-871.85	4,832.67	0.00	0.00	0.00	
11,500.00	90.00	180.84	6,382.00	-4,870.04	-873.31	4,932.32	0.00	0.00	0.00	
11,600.00	90.00	180.84	6,382.00	-4,970.03	-874.78	5,031.97	0.00	0.00	0.00	
11,700.00	90.00	180.84	6,382.00	-5,070.02	-876.24	5,131.61	0.00	0.00	0.00	
11,800.00	90.00	180.84	6,382.00	-5,170.01	-877.70	5,231.26	0.00	0.00	0.00	
11,900.00	90.00	180.84	6,382.00	-5,270.00	-879.17	5,330.91	0.00	0.00	0.00	
12,000.00	90.00	180.84	6,382.00	-5,369.99	-880.63	5,430.56	0.00	0.00	0.00	
12,100.00	90.00	180.84	6,382.00	-5,469.98	-882.09	5,530.21	0.00	0.00	0.00	
12,200.00	90.00	180.84	6,382.00	-5,569.96	-883.56	5,629.86	0.00	0.00	0.00	
12,300.00	90.00	180.84	6,382.00	-5,669.95	-885.02	5,729.50	0.00	0.00	0.00	
12,400.00	90.00	180.84	6,382.00	-5,769.94	-886.48	5,829.15	0.00	0.00	0.00	
12,500.00	90.00	180.84	6,382.00	-5,869.93	-887.95	5,928.80	0.00	0.00	0.00	
12,600.00	90.00	180.84	6,382.00	-5,969.92	-889.41	6,028.45	0.00	0.00	0.00	
12,700.00	90.00	180.84	6,382.00	-6,069.91	-890.87	6,128.10	0.00	0.00	0.00	
12,800.00	90.00	180.84	6,382.00	-6,169.90	-892.34	6,227.75	0.00	0.00	0.00	
12,900.00	90.00	180.84	6,382.00	-6,269.89	-893.80	6,327.40	0.00	0.00	0.00	
13,000.00	90.00	180.84	6,382.00	-6,369.88	-895.26	6,427.04	0.00	0.00	0.00	
13,100.00	90.00	180.84	6,382.00	-6,469.87	-896.73	6,526.69	0.00	0.00	0.00	
13,200.00	90.00	180.84	6,382.00	-6,569.86	-898.19	6,626.34	0.00	0.00	0.00	
13,300.00	90.00	180.84	6,382.00	-6,669.85	-899.66	6,725.99	0.00	0.00	0.00	
13,400.00	90.00	180.84	6,382.00	-6,769.84	-901.12	6,825.64	0.00	0.00	0.00	
13,500.00	90.00	180.84	6,382.00	-6,869.83	-902.58	6,925.29	0.00	0.00	0.00	
13,600.00	90.00	180.84	6,382.00	-6,969.81	-904.05	7,024.94	0.00	0.00	0.00	

## Planning Report

<b>Database:</b>	EDM 5000.16 Single User Db	<b>Local Co-ordinate Reference:</b>	Well GADWALL 30-31-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB 27' @ 4977.00usft
<b>Project:</b>	WELD COUNTY	<b>MD Reference:</b>	KB 27' @ 4977.00usft
<b>Site:</b>	SEC 30-T8N-R60W	<b>North Reference:</b>	True
<b>Well:</b>	GADWALL 30-31-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	PROPOSAL 1		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
13,700.00	90.00	180.84	6,382.00	-7,069.80	-905.51	7,124.58	0.00	0.00	0.00	
13,800.00	90.00	180.84	6,382.00	-7,169.79	-906.97	7,224.23	0.00	0.00	0.00	
13,900.00	90.00	180.84	6,382.00	-7,269.78	-908.44	7,323.88	0.00	0.00	0.00	
14,000.00	90.00	180.84	6,382.00	-7,369.77	-909.90	7,423.53	0.00	0.00	0.00	
14,100.00	90.00	180.84	6,382.00	-7,469.76	-911.36	7,523.18	0.00	0.00	0.00	
14,200.00	90.00	180.84	6,382.00	-7,569.75	-912.83	7,622.83	0.00	0.00	0.00	
14,300.00	90.00	180.84	6,382.00	-7,669.74	-914.29	7,722.48	0.00	0.00	0.00	
14,400.00	90.00	180.84	6,382.00	-7,769.73	-915.75	7,822.12	0.00	0.00	0.00	
14,500.00	90.00	180.84	6,382.00	-7,869.72	-917.22	7,921.77	0.00	0.00	0.00	
14,600.00	90.00	180.84	6,382.00	-7,969.71	-918.68	8,021.42	0.00	0.00	0.00	
14,700.00	90.00	180.84	6,382.00	-8,069.70	-920.14	8,121.07	0.00	0.00	0.00	
14,800.00	90.00	180.84	6,382.00	-8,169.69	-921.61	8,220.72	0.00	0.00	0.00	
14,900.00	90.00	180.84	6,382.00	-8,269.68	-923.07	8,320.37	0.00	0.00	0.00	
15,000.00	90.00	180.84	6,382.00	-8,369.66	-924.53	8,420.01	0.00	0.00	0.00	
15,100.00	90.00	180.84	6,382.00	-8,469.65	-926.00	8,519.66	0.00	0.00	0.00	
15,200.00	90.00	180.84	6,382.00	-8,569.64	-927.46	8,619.31	0.00	0.00	0.00	
15,300.00	90.00	180.84	6,382.00	-8,669.63	-928.92	8,718.96	0.00	0.00	0.00	
15,400.00	90.00	180.84	6,382.00	-8,769.62	-930.39	8,818.61	0.00	0.00	0.00	
15,500.00	90.00	180.84	6,382.00	-8,869.61	-931.85	8,918.26	0.00	0.00	0.00	
15,600.00	90.00	180.84	6,382.00	-8,969.60	-933.31	9,017.91	0.00	0.00	0.00	
15,700.00	90.00	180.84	6,382.00	-9,069.59	-934.78	9,117.55	0.00	0.00	0.00	
15,800.00	90.00	180.84	6,382.00	-9,169.58	-936.24	9,217.20	0.00	0.00	0.00	
15,900.00	90.00	180.84	6,382.00	-9,269.57	-937.71	9,316.85	0.00	0.00	0.00	
16,000.00	90.00	180.84	6,382.00	-9,369.56	-939.17	9,416.50	0.00	0.00	0.00	
16,100.00	90.00	180.84	6,382.00	-9,469.55	-940.63	9,516.15	0.00	0.00	0.00	
16,157.34	90.00	180.84	6,382.00	-9,526.88	-941.47	9,573.28	0.00	0.00	0.00	
TD at 16157.34										

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
LP-GADWELL 4HN - hit/miss target - Shape - plan hits target center - Point	0.00	0.00	6,382.00	-154.08	-804.29	1,478,180.26	3,378,516.13	40.638010°N	104.136084°W
PBHL-GADWELL 4HN - plan hits target center - Point	0.00	0.00	6,382.00	-9,526.88	-941.47	1,468,806.46	3,378,523.42	40.612283°N	104.136577°W

## Planning Report

<b>Database:</b>	EDM 5000.16 Single User Db	<b>Local Co-ordinate Reference:</b>	Well GADWALL 30-31-4HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	KB 27' @ 4977.00usft
<b>Project:</b>	WELD COUNTY	<b>MD Reference:</b>	KB 27' @ 4977.00usft
<b>Site:</b>	SEC 30-T8N-R60W	<b>North Reference:</b>	True
<b>Well:</b>	GADWALL 30-31-4HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OWB		
<b>Design:</b>	PROPOSAL 1		

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
165.00	165.00	*Laramie Base				
610.00	610.00	*Laramie Fox Hills Base				
915.20	915.00	*Pierre Shale Base				
1,709.70	1,700.00	*Upper Pierre Shale Base (SFC min dep:				
3,436.01	3,402.00	Richard Sandstone				
3,557.73	3,522.00	Parkman Sandstone				
3,922.87	3,882.00	Parkman Sandstone Base				
6,293.48	6,187.00	Sharon Springs				
6,349.52	6,227.00	Niobrara Top				
6,651.43	6,367.00	Niobrara B2 Chalk Top				
6,707.38	6,377.00	Niobrara B2 Chalk Target Top				
6,783.54	6,382.00	Niobrara B2 Chalk Landing Point				

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
700.00	700.00	0.00	0.00	Start Build 2.00
1,181.34	1,179.08	20.47	-34.76	Start 4654.73 hold at 1181.34 MD
5,836.07	5,768.26	415.52	-705.48	Start DLS 10.00 TFO -119.31
6,783.54	6,382.00	-154.08	-804.29	Start 9373.80 hold at 6783.54 MD
16,157.34	6,382.00	-9,526.88	-941.47	TD at 16157.34