



COG Operating LLC

Eddy County, NM (NAD-27 2015)

Beech 25 Federal #12H

SHL: 481' FSL, 237' FWL, Sec 25, T17S, R27E, Unit M

PP: 477' FSL, 330' FWL, Sec 25, T17S, R27E, Unit M

BHL: 330' FSL, 1654' FEL, Sec 25, T17S, R27E, Unit O

Plan: Design #1

Standard Planning Report

09 May, 2016



Database: EDM 5000.1 Single User Db
Company: COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Site: Beech 25 Federal #12H
Well: SHL: 481' FSL, 237' FWL, Sec 25, T17S, R27E, Unit M
Wellbore: BHL: 330' FSL, 1654' FEL, Sec 25, T17S, R27E, Unit O
Design: Design #1

Local Co-ordinate Reference: Well SHL: 481' FSL, 237' FWL, Sec 25, T17S, R27E, Unit M
TVD Reference: KB @ 3604.00usft (Silver Oak 3)
MD Reference: KB @ 3604.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Project: Eddy County, NM (NAD-27 2015)
Map System: US State Plane 1927 (Exact solution) System Datum: Mean Sea Level
Geo Datum: NAD 1927 (NADCON CONUS)
Map Zone: New Mexico East 3001

Site: Beech 25 Federal #12H
Site Position: Northing: 654,438.40 usft Latitude: 32° 47' 56.780 N
From: Map Easting: 528,820.40 usft Longitude: 104° 14' 22.345 W
Position Uncertainty: 0.00 usft Slot Radius: 13.20 in Grid Convergence: 0.05 °

Well: SHL: 481' FSL, 237' FWL, Sec 25, T17S, R27E, Unit M
Well Position: +N/-S 0.00 usft Northing: 654,438.40 usft Latitude: 32° 47' 56.780 N
+E/-W 0.00 usft Easting: 528,820.40 usft Longitude: 104° 14' 22.345 W
Position Uncertainty: 0.00 usft Wellhead Elevation: 0.00 usft Ground Level: 3,586.00 usft

Wellbore: BHL: 330' FSL, 1654' FEL, Sec 25, T17S, R27E, Unit O
Magnetics: Model Name Sample Date Declination Dip Angle Field Strength
(°) (°) (nT)
IGRF2015 5/9/2016 7.43 60.49 48,320

Design: Design #1
Audit Notes:
Version: Phase: PLAN Tie On Depth: 0.00
Vertical Section: Depth From (TVD) +N/-S +E/-W Direction
(usft) (usft) (usft) (°)
0.00 0.00 0.00 92.97

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,449.57	0.00	0.00	3,449.57	0.00	0.00	0.00	0.00	0.00	0.00	
4,272.30	90.50	92.97	3,970.42	-27.18	524.71	11.00	11.00	11.30	92.97	
7,155.25	90.50	92.97	3,945.26	-176.30	3,403.70	0.00	0.00	0.00	0.00	PBHL (B25F #12H/L1)



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well SHL: 481' FSL, 237' FWL, Sec 25, T17S, R27E, Unit M
Company:	COG Operating LLC	TVD Reference:	KB @ 3604.00usft (Silver Oak 3)
Project:	Eddy County, NM (NAD-27 2015)	MD Reference:	KB @ 3604.00usft (Silver Oak 3)
Site:	Beech 25 Federal #12H	North Reference:	Grid
Well:	SHL: 481' FSL, 237' FWL, Sec 25, T17S, R27E, Unit M	Survey Calculation Method:	Minimum Curvature
Wellbore:	BHL: 330' FSL, 1654' FEL, Sec 25, T17S, R27E, Unit O		
Design:	Design #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	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
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,449.57	0.00	0.00	3,449.57	0.00	0.00	0.00	0.00	0.00	0.00
Start DLS 11.00 TFO 92.97									
3,500.00	5.55	92.97	3,499.92	-0.13	2.44	2.44	11.00	11.00	0.00
3,550.00	11.05	92.97	3,549.38	-0.50	9.64	9.65	11.00	11.00	0.00
3,600.00	16.55	92.97	3,597.92	-1.12	21.54	21.57	11.00	11.00	0.00
3,650.00	22.05	92.97	3,645.09	-1.97	38.04	38.09	11.00	11.00	0.00
3,700.00	27.55	92.97	3,690.46	-3.05	58.97	59.05	11.00	11.00	0.00
3,750.00	33.05	92.97	3,733.62	-4.36	84.15	84.27	11.00	11.00	0.00
3,800.00	38.55	92.97	3,774.16	-5.87	113.35	113.50	11.00	11.00	0.00
3,850.00	44.05	92.97	3,811.71	-7.58	146.29	146.49	11.00	11.00	0.00
3,900.00	49.55	92.97	3,845.92	-9.46	182.67	182.92	11.00	11.00	0.00
3,950.00	55.05	92.97	3,876.49	-11.51	222.17	222.46	11.00	11.00	0.00
4,000.00	60.55	92.97	3,903.12	-13.70	264.40	264.76	11.00	11.00	0.00
4,050.00	66.05	92.97	3,925.58	-16.00	308.99	309.41	11.00	11.00	0.00
4,100.00	71.55	92.97	3,943.66	-18.42	355.53	356.00	11.00	11.00	0.00
4,150.00	77.05	92.97	3,957.19	-20.90	403.58	404.12	11.00	11.00	0.00

Database: EDM 5000.1 Single User Db
Company: COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Site: Beech 25 Federal #12H
Well: SHL: 481' FSL, 237' FWL, Sec 25, T17S, R27E, Unit M
Wellbore: BHL: 330' FSL, 1654' FEL, Sec 25, T17S, R27E, Unit O
Design: Design #1

Local Co-ordinate Reference: Well SHL: 481' FSL, 237' FWL, Sec 25, T17S, R27E, Unit M
TVD Reference: KB @ 3604.00usft (Silver Oak 3)
MD Reference: KB @ 3604.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,200.00	82.55	92.97	3,966.04	-23.45	452.70	453.31	11.00	11.00	0.00
4,250.00	88.05	92.97	3,970.14	-26.03	502.45	503.12	11.00	11.00	0.00
4,272.30	90.50	92.97	3,970.42	-27.18	524.71	525.42	11.00	11.00	0.00
Start 2882.96 hold at 4272.30 MD									
4,300.00	90.50	92.97	3,970.18	-28.61	552.38	553.12	0.00	0.00	0.00
4,400.00	90.50	92.97	3,969.31	-33.78	652.24	653.11	0.00	0.00	0.00
4,500.00	90.50	92.97	3,968.43	-38.96	752.10	753.11	0.00	0.00	0.00
4,600.00	90.50	92.97	3,967.56	-44.13	851.96	853.11	0.00	0.00	0.00
4,700.00	90.50	92.97	3,966.69	-49.30	951.83	953.10	0.00	0.00	0.00
4,800.00	90.50	92.97	3,965.81	-54.47	1,051.69	1,053.10	0.00	0.00	0.00
4,900.00	90.50	92.97	3,964.94	-59.65	1,151.55	1,153.09	0.00	0.00	0.00
5,000.00	90.50	92.97	3,964.07	-64.82	1,251.41	1,253.09	0.00	0.00	0.00
5,100.00	90.50	92.97	3,963.20	-69.99	1,351.28	1,353.09	0.00	0.00	0.00
5,200.00	90.50	92.97	3,962.32	-75.16	1,451.14	1,453.08	0.00	0.00	0.00
5,300.00	90.50	92.97	3,961.45	-80.34	1,551.00	1,553.08	0.00	0.00	0.00
5,400.00	90.50	92.97	3,960.58	-85.51	1,650.86	1,653.08	0.00	0.00	0.00
5,500.00	90.50	92.97	3,959.70	-90.68	1,750.73	1,753.07	0.00	0.00	0.00
5,600.00	90.50	92.97	3,958.83	-95.85	1,850.59	1,853.07	0.00	0.00	0.00
5,700.00	90.50	92.97	3,957.96	-101.03	1,950.45	1,953.06	0.00	0.00	0.00
5,800.00	90.50	92.97	3,957.09	-106.20	2,050.31	2,053.06	0.00	0.00	0.00
5,900.00	90.50	92.97	3,956.21	-111.37	2,150.17	2,153.06	0.00	0.00	0.00
6,000.00	90.50	92.97	3,955.34	-116.54	2,250.04	2,253.05	0.00	0.00	0.00
6,100.00	90.50	92.97	3,954.47	-121.72	2,349.90	2,353.05	0.00	0.00	0.00
6,200.00	90.50	92.97	3,953.59	-126.89	2,449.76	2,453.05	0.00	0.00	0.00
6,300.00	90.50	92.97	3,952.72	-132.06	2,549.62	2,553.04	0.00	0.00	0.00
6,400.00	90.50	92.97	3,951.85	-137.23	2,649.49	2,653.04	0.00	0.00	0.00
6,500.00	90.50	92.97	3,950.98	-142.41	2,749.35	2,753.03	0.00	0.00	0.00
6,600.00	90.50	92.97	3,950.10	-147.58	2,849.21	2,853.03	0.00	0.00	0.00
6,700.00	90.50	92.97	3,949.23	-152.75	2,949.07	2,953.03	0.00	0.00	0.00
6,800.00	90.50	92.97	3,948.36	-157.92	3,048.94	3,053.02	0.00	0.00	0.00
6,900.00	90.50	92.97	3,947.48	-163.10	3,148.80	3,153.02	0.00	0.00	0.00
7,000.00	90.50	92.97	3,946.61	-168.27	3,248.66	3,253.02	0.00	0.00	0.00
7,100.00	90.50	92.97	3,945.74	-173.44	3,348.52	3,353.01	0.00	0.00	0.00
7,155.25	90.50	92.97	3,945.26	-176.30	3,403.70	3,408.26	0.00	0.00	0.00

TD at 7155.25

Database: EDM 5000.1 Single User Db

Local Co-ordinate Reference:

Well SHL: 481' FSL, 237' FWL, Sec 25,
T17S, R27E, Unit M

Company: COG Operating LLC

TVD Reference:

KB @ 3604.00usft (Silver Oak 3)

Project: Eddy County, NM (NAD-27 2015)

MD Reference:

KB @ 3604.00usft (Silver Oak 3)

Site: Beech 25 Federal #12H

North Reference:

Grid

Well: SHL: 481' FSL, 237' FWL, Sec 25, T17S,
R27E, Unit M

Survey Calculation Method:

Minimum Curvature

Wellbore: BHL: 330' FSL, 1654' FEL, Sec 25, T17S,
R27E, Unit O

Design: Design #1

Design Targets

Target Name

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
KOP (B25F #12H/L1 De - plan hits target center - Point	0.00	0.00	3,449.57	0.00	0.00	654,438.40	528,820.40	32° 47' 56.780 N	104° 14' 22.345 W
PP (B25F #12H/L1 Desi: - plan hits target center - Point	0.00	0.00	3,746.79	-4.82	93.00	654,433.59	528,913.40	32° 47' 56.732 N	104° 14' 21.255 W
PBHL (B25F #12H/L1) - plan hits target center - Point	0.00	0.00	3,945.26	-176.30	3,403.70	654,262.10	532,224.10	32° 47' 55.004 N	104° 13' 42.470 W
EOC (B25F #12H/L1 De - plan hits target center - Point	0.00	0.00	3,970.42	-27.18	524.72	654,411.23	529,345.12	32° 47' 56.507 N	104° 14' 16.197 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
3,449.57	3,449.57	0.00	0.00	Start DLS 11.00 TFO 92.97
4,272.30	3,970.42	-27.18	524.71	Start 2882.96 hold at 4272.30 MD
7,155.25	3,945.26	-176.30	3,403.70	TD at 7155.25



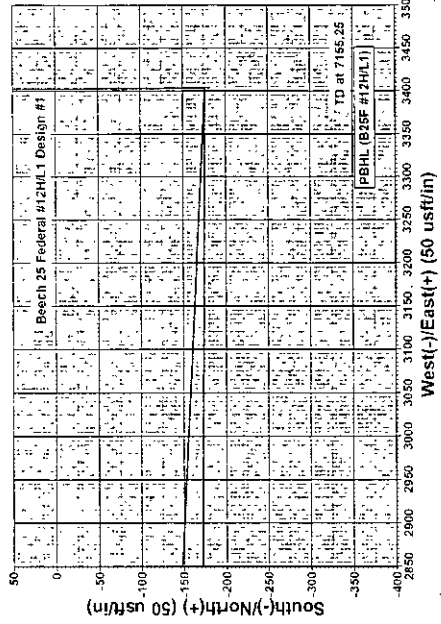
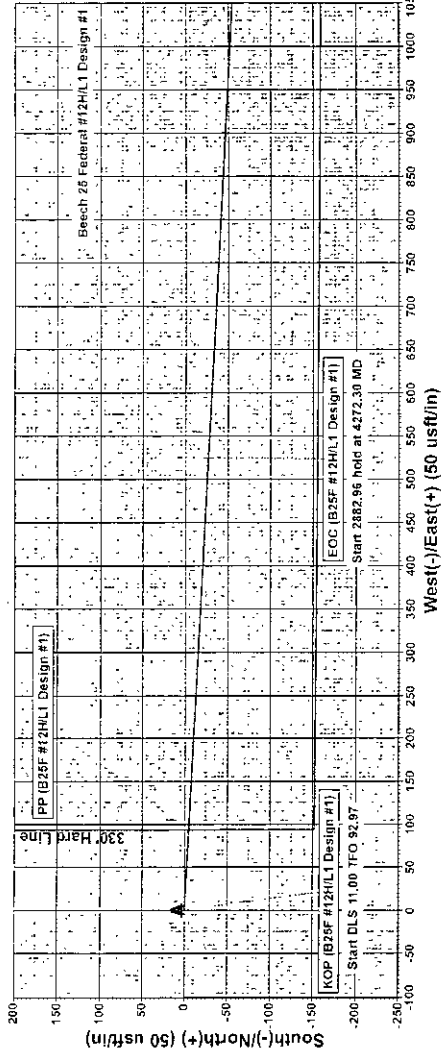
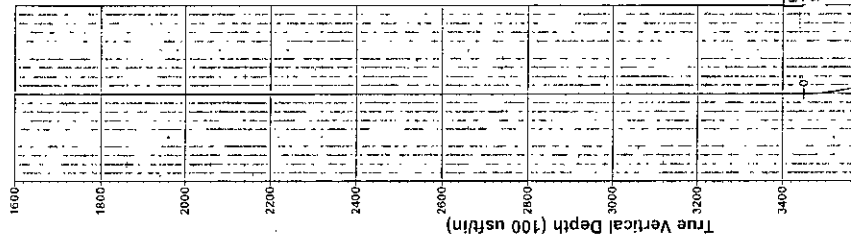
COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Site: Beech 25 Federal #12H

Well: SHL: 481' FSL, 237' FWL, Sec 25, T17S, R27E, Unit M
Wellbore: BHL: 330' FSL, 1654' FEL, Sec 25, T17S, R27E, Unit O

Plan: Design #1 (SHL: 481' FSL, 237' FWL, Sec 25, T17S, R27E, Unit M/BHL: 330' FSL, 1654' FEL, Sec 25, T17S, R27E, Unit O)

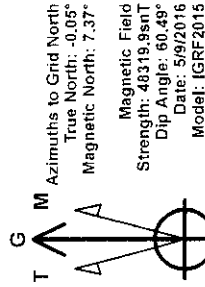
Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	3449.57	0.00	0.00	3449.57	0.00	0.00	0.00	0.00	0.00	0.00
3	4272.30	90.50	92.97	3970.42	-27.18	524.71	11.00	92.97	525.42	0.00
4	7155.25	90.50	92.97	3946.26	-176.30	3403.70	0.00	0.00	3408.26	PBHL (B25F #12H/L1)

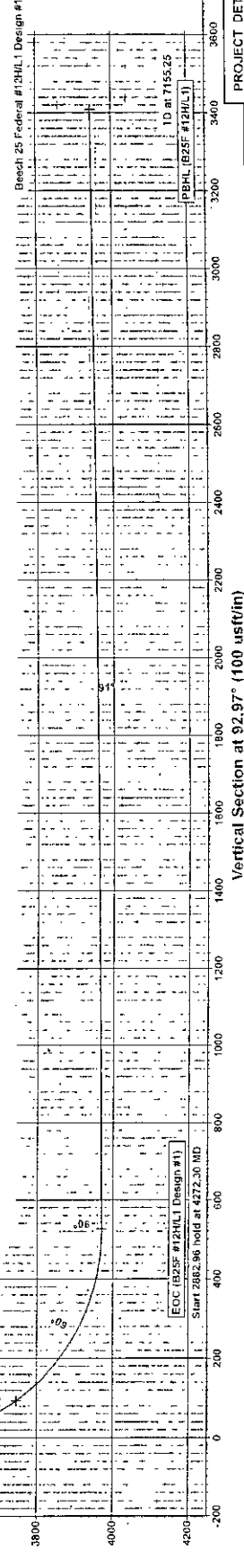
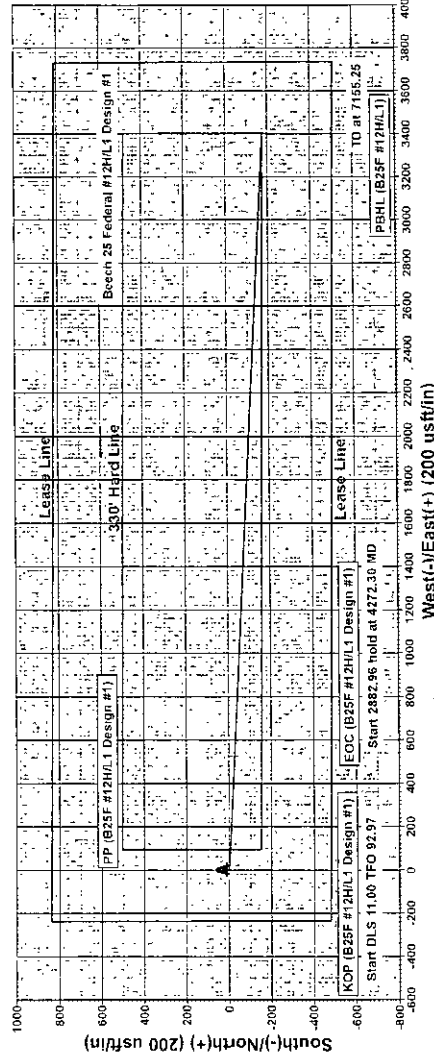


Ground Elevation: 3586.00
RKB Elevation: KB @ 3604.00usft (Silver Oak 3)

Northings: 528820.40
Easting: 528820.40
Latitude: 32° 47' 56.780 N
Longitude: 104° 14' 22.345 W



Magnetic Field
Strength: 48319.9nT
Dip Angle: 60.48°
Date: 5/9/2016
Model: GRF2015



Vertical Section at 92.97° (100 usft/in)

Vertical Section at 92.97° (100 usft/in)

PROJECT: Eddy County, NM (NAD-27 2015)
Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level
Local North: Grid



Terra Directional Services LLC
322 Spring Hill Drive, Suite A300, Spring, Tx 77386
Phone: 432-425-7532