



## Directional Survey Certification

2948 I-70 Business Loop  
Grand Junction, CO 81504  
(970)-245-9447 Fax (970)-245-9454

Operator	TEP Rocky Mountain, LLC.
Well Name & No.	GM 443-5
County & State	Garfield County, CO
SDI Job No.	OP.004497
Rig	H&P 271

I, Mel Mireles Jr., having personal knowledge of all the facts, hereby certify that the attached directional survey run from a measured depth of 122 feet to a measured depth of 6,705 feet is true and correct as determined from all available records.

  
Signature

05-Oct-17  
Date

**Mel Mireles Jr.**  
Grand Junction Assistant Well Planner  
Scientific Drilling - Colorado District

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 443-5 - Slot A7 (GM 443-5)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
<b>Site:</b>	MV 34-5 Pad	<b>MD Reference:</b>	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
<b>Well:</b>	GM 443-5	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Grand Junction District

<b>Project</b>	Garfield County, CO NAD83		
<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 Central Zone		

Site		MV 34-5 Pad			
Site Position:		Northing:	1,603,476.79 usft	Latitude:	39.4609066
From:	Map	Easting:	2,258,772.10 usft	Longitude:	-108.1256571
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.66 °

Well	GM 443-5 - Slot A7 (GM 443-5)					
Well Position	+N/-S	0.00 usft	Northing:	1,603,507.86 usft	Latitude:	39.4609935
	+E/-W	0.00 usft	Easting:	2,258,792.35 usft	Longitude:	-108.1255886
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	5,977.00 usft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	9/21/2017	9.57	65.77	51,763

<b>Design</b>	OH				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<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	348.53	

<b>Survey Program</b>	<b>Date</b>	10/5/2017			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
122.00	677.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
754.00	992.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,079.00	6,705.00	Survey #3 - Production MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	

<b>Survey</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>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
122.00	0.70	289.51	122.00	0.25	-0.70	0.38	0.57	0.57	0.00	
<b>First SDI Gyro MWD Survey</b>										
215.00	3.08	312.63	214.94	2.13	-3.08	2.70	2.64	2.56	24.86	
307.00	6.86	316.23	306.58	7.77	-8.70	9.35	4.12	4.11	3.91	
399.00	10.73	319.31	397.48	18.24	-18.09	21.47	4.24	4.21	3.35	
491.00	12.93	330.82	487.53	33.72	-28.69	38.76	3.50	2.39	12.51	
584.00	15.92	346.20	577.62	55.21	-36.81	61.43	5.20	3.22	16.54	
677.00	18.83	357.89	666.40	82.61	-40.41	88.99	4.87	3.13	12.57	

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 443-5 - Slot A7 (GM 443-5)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
<b>Site:</b>	MV 34-5 Pad	<b>MD Reference:</b>	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
<b>Well:</b>	GM 443-5	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Grand Junction District

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)
<b>Last SDI Gyro MWD Survey</b>									
754.00	20.04	358.69	739.01	108.22	-41.17	114.24	1.61	1.57	1.04
<b>First SDI Surface MWD Survey</b>									
847.00	20.96	359.24	826.12	140.78	-41.75	146.27	1.01	0.99	0.59
941.00	20.63	358.53	914.00	174.14	-42.40	179.10	0.44	-0.35	-0.76
992.00	20.69	358.41	961.72	192.13	-42.88	196.82	0.14	0.12	-0.24
<b>Last SDI Surface MWD Survey</b>									
1,079.00	21.13	358.49	1,042.99	223.17	-43.72	227.41	0.51	0.51	0.09
<b>First SDI Production MWD Survey</b>									
1,173.00	20.90	357.39	1,130.73	256.86	-44.93	260.66	0.49	-0.24	-1.17
1,268.00	23.27	359.70	1,218.76	292.56	-45.80	295.82	2.66	2.49	2.43
1,362.00	23.08	359.31	1,305.17	329.55	-46.12	332.14	0.26	-0.20	-0.41
1,457.00	22.35	359.04	1,392.80	366.23	-46.65	368.19	0.78	-0.77	-0.28
1,552.00	21.24	359.99	1,481.01	401.50	-46.95	402.82	1.23	-1.17	1.00
1,646.00	22.57	1.88	1,568.23	436.56	-46.36	437.06	1.60	1.41	2.01
1,741.00	21.06	1.40	1,656.42	471.84	-45.35	471.44	1.60	-1.59	-0.51
1,836.00	22.11	0.45	1,744.76	506.78	-44.79	505.57	1.16	1.11	-1.00
1,930.00	20.90	357.78	1,832.21	541.23	-45.30	539.43	1.66	-1.29	-2.84
2,025.00	22.63	356.63	1,920.44	576.41	-47.03	574.25	1.88	1.82	-1.21
2,120.00	21.61	354.25	2,008.45	612.06	-49.86	609.76	1.43	-1.07	-2.51
2,214.00	22.60	355.77	2,095.54	647.30	-52.93	644.90	1.22	1.05	1.62
2,309.00	23.37	356.53	2,182.99	684.31	-55.41	681.67	0.87	0.81	0.80
2,403.00	22.60	356.71	2,269.53	720.95	-57.58	718.01	0.82	-0.82	0.19
2,497.00	21.31	356.75	2,356.71	756.04	-59.58	752.79	1.37	-1.37	0.04
2,592.00	18.73	356.92	2,445.96	788.51	-61.38	784.97	2.72	-2.72	0.18
2,686.00	17.52	358.01	2,535.30	817.72	-62.68	813.86	1.34	-1.29	1.16
2,781.00	18.48	358.57	2,625.65	847.07	-63.56	842.79	1.03	1.01	0.59
2,876.00	17.40	358.66	2,716.03	876.32	-64.26	871.60	1.14	-1.14	0.09
2,970.00	16.44	359.02	2,805.96	903.67	-64.82	898.51	1.03	-1.02	0.38
3,064.00	15.84	358.74	2,896.25	929.80	-65.33	924.22	0.64	-0.64	-0.30
3,159.00	13.98	2.85	2,988.05	954.22	-65.04	948.10	2.25	-1.96	4.33
3,253.00	12.13	6.58	3,079.62	975.38	-63.35	968.49	2.16	-1.97	3.97
3,348.00	10.54	12.77	3,172.77	993.77	-60.28	985.91	2.11	-1.67	6.52
3,442.00	9.75	17.15	3,265.30	1,009.76	-56.03	1,000.74	1.17	-0.84	4.66
3,536.00	6.86	17.07	3,358.30	1,022.73	-52.04	1,012.66	3.07	-3.07	-0.09
3,631.00	6.45	19.53	3,452.66	1,033.18	-48.59	1,022.21	0.53	-0.43	2.59
3,725.00	3.94	23.86	3,546.27	1,041.12	-45.52	1,029.38	2.70	-2.67	4.61
3,728.63	3.93	23.83	3,549.89	1,041.34	-45.42	1,029.58	0.18	-0.17	-0.85
<b>GM 443-5 MVRD</b>									
3,757.76	3.88	23.58	3,578.95	1,043.16	-44.62	1,031.20	0.18	-0.17	-0.86
<b>GM 532-4 MVRD</b>									
3,820.00	3.78	23.02	3,641.05	1,046.98	-42.97	1,034.62	0.18	-0.17	-0.90
3,914.00	3.32	19.54	3,734.87	1,052.40	-40.85	1,039.51	0.54	-0.49	-3.70
4,009.00	3.01	23.21	3,829.73	1,057.28	-38.95	1,043.92	0.39	-0.33	3.86

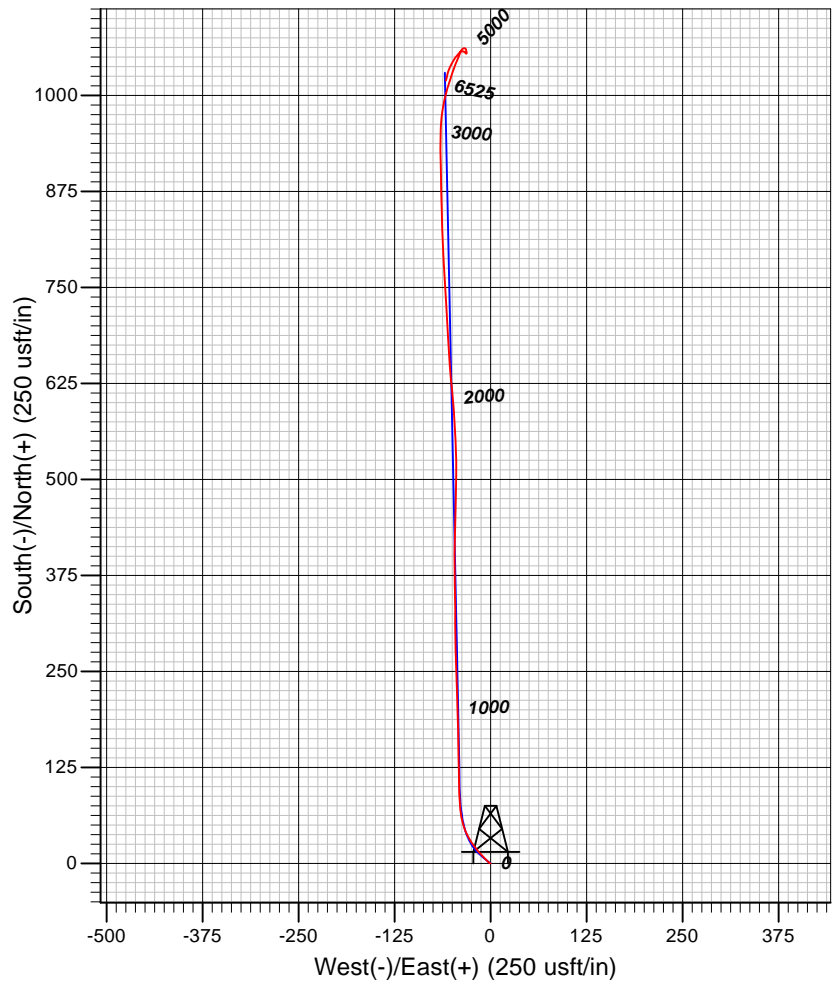
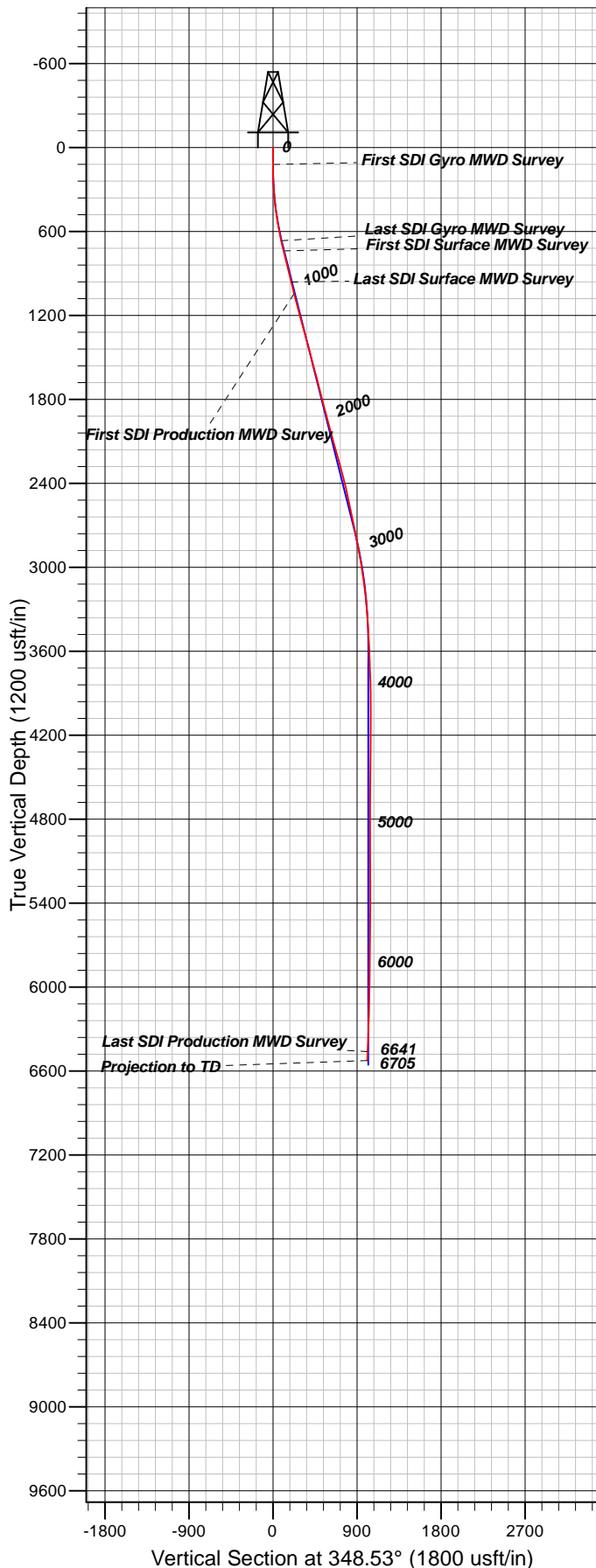
<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 443-5 - Slot A7 (GM 443-5)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
<b>Site:</b>	MV 34-5 Pad	<b>MD Reference:</b>	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
<b>Well:</b>	GM 443-5	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Grand Junction District

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)
4,104.00	1.09	53.29	3,924.66	1,060.12	-37.24	1,046.35	2.25	-2.02	31.66
4,198.00	1.01	62.74	4,018.65	1,061.03	-35.79	1,046.96	0.20	-0.09	10.05
4,293.00	0.74	64.79	4,113.64	1,061.68	-34.49	1,047.33	0.29	-0.28	2.16
4,387.00	0.60	114.56	4,207.63	1,061.73	-33.49	1,047.19	0.61	-0.15	52.95
4,482.00	0.62	141.55	4,302.63	1,061.12	-32.72	1,046.44	0.30	0.02	28.41
4,576.00	0.76	156.16	4,396.62	1,060.15	-32.15	1,045.37	0.24	0.15	15.54
4,671.00	0.79	169.53	4,491.61	1,058.93	-31.78	1,044.10	0.19	0.03	14.07
4,765.00	0.95	170.42	4,585.60	1,057.53	-31.53	1,042.68	0.17	0.17	0.95
4,860.00	0.87	178.96	4,680.59	1,056.03	-31.39	1,041.18	0.17	-0.08	8.99
4,871.97	0.88	178.00	4,692.56	1,055.85	-31.38	1,041.00	0.15	0.09	-8.00
<b>GM 532-5 KMV</b>									
4,955.00	0.96	171.97	4,775.58	1,054.52	-31.26	1,039.68	0.15	0.10	-7.27
5,049.00	0.88	321.63	4,869.57	1,054.31	-31.60	1,039.53	1.89	-0.09	159.21
5,144.00	0.97	312.35	4,964.56	1,055.42	-32.65	1,040.83	0.18	0.09	-9.77
5,238.00	0.83	308.30	5,058.55	1,056.38	-33.77	1,042.00	0.16	-0.15	-4.31
5,333.00	0.69	297.37	5,153.54	1,057.07	-34.82	1,042.88	0.21	-0.15	-11.51
5,428.00	0.70	277.68	5,248.53	1,057.41	-35.90	1,043.43	0.25	0.01	-20.73
5,522.00	0.90	259.97	5,342.52	1,057.36	-37.20	1,043.64	0.34	0.21	-18.84
5,619.00	0.84	266.99	5,439.51	1,057.19	-38.66	1,043.76	0.13	-0.06	7.24
5,713.00	1.38	220.27	5,533.50	1,056.29	-40.08	1,043.16	1.07	0.57	-49.70
5,808.00	1.53	219.88	5,628.47	1,054.44	-41.63	1,041.66	0.16	0.16	-0.41
5,902.00	2.10	221.39	5,722.42	1,052.18	-43.57	1,039.84	0.61	0.61	1.61
5,997.00	1.93	219.54	5,817.36	1,049.64	-45.74	1,037.78	0.19	-0.18	-1.95
6,091.00	1.64	204.09	5,911.31	1,047.20	-47.30	1,035.69	0.59	-0.31	-16.44
6,186.00	1.81	213.56	6,006.27	1,044.70	-48.68	1,033.52	0.35	0.18	9.97
6,280.00	2.32	209.30	6,100.21	1,041.81	-50.43	1,031.03	0.57	0.54	-4.53
6,375.00	2.76	204.77	6,195.12	1,038.05	-52.33	1,027.73	0.51	0.46	-4.77
6,469.00	3.08	205.11	6,288.99	1,033.71	-54.35	1,023.88	0.34	0.34	0.36
6,564.00	3.41	193.04	6,383.84	1,028.65	-56.07	1,019.26	0.80	0.35	-12.71
6,641.00	4.04	191.86	6,460.68	1,023.76	-57.15	1,014.68	0.82	0.82	-1.53
<b>Last SDI Production MWD Survey</b>									
6,705.00	4.04	191.86	6,524.52	1,019.35	-58.07	1,010.54	0.00	0.00	0.00
<b>Projection to TD - GM 532-5 PBHL - GM 443-5 PBHL</b>									

<b>Company:</b>	TEP Rocky Mountain LLC	<b>Local Co-ordinate Reference:</b>	Well GM 443-5 - Slot A7 (GM 443-5)
<b>Project:</b>	Garfield County, CO NAD83	<b>TVD Reference:</b>	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
<b>Site:</b>	MV 34-5 Pad	<b>MD Reference:</b>	GL 5977' & RKB 24' @ 6001.00usft (H&P 271)
<b>Well:</b>	GM 443-5	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Grand Junction District

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
122.00	122.00	0.25	-0.70	First SDI Gyro MWD Survey
677.00	666.40	82.61	-40.41	Last SDI Gyro MWD Survey
754.00	739.01	108.22	-41.17	First SDI Surface MWD Survey
992.00	961.72	192.13	-42.88	Last SDI Surface MWD Survey
1,079.00	1,042.99	223.17	-43.72	First SDI Production MWD Survey
6,641.00	6,460.68	1,023.76	-57.15	Last SDI Production MWD Survey
6,705.00	6,524.52	1,019.35	-58.07	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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#### Well Details: GM 443-5

TVD Reference: GL 5977' & RKB 24' @ 6001.00usft (H&P 271) and Level: 5977.00  
 +N/-S +E/-W Northing Easting Latitude Longitude Slot  
 0.00 0.00 1603507.86 2258792.35 39.4609934 -108.1255886 A7 (GM 443-5)

#### REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well GM 443-5 - Slot A7 (GM 443-5), True North  
 Vertical (TVD) Reference: GL 5977' & RKB 24' @ 6001.00usft (H&P 271)  
 Section (VS) Reference: Slot - A7 (GM 443-5)(0.00N, 0.00E)  
 Measured Depth Reference: GL 5977' & RKB 24' @ 6001.00usft (H&P 271)  
 Calculation Method: Minimum Curvature

#### PROJECT DETAILS: Garfield County, CO NAD83

Geodetic System: US State Plane 1983  
 Datum: North American Datum 1983  
 Ellipsoid: GRS 1980  
 Zone: Colorado Central Zone

System Datum: Mean Sea Level

Plan: OH

12:44, October 05 2017  
 Created By: Mel Mireles Jr.