# Great Western

Well Name: **Bruegman South EG 34-027HN**

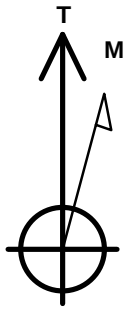
Surface Location: Bruegman South Pad Sec.34-T7N-R64W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4844.8

| +N/-S | +E/-W | Northing | Easting | Latittude | Longitude | Slot |
|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 1434974.80 | 3265728.83 | 40.523475 | -104.544133 | |

RKB - 16.5' WELL @ 4861.3ft (RKB - 16.5')

## WELLBORE TARGET DETAILS

| Name | TVD | +N/-S | +E/-W | Shape |
|---|---|---|---|---|
| SHL 367'FSL & 438'FWL | 1.0 | 0.0 | 0.0 | Point |
| BHL 470'FNL & 1610'FWL | 6957.3 | 4446.9 | 1138.0 | Point |
| Entry Pt. 460'FSL & 1601'FWL | 6957.3 | 97.3 | 1162.1 | Point |



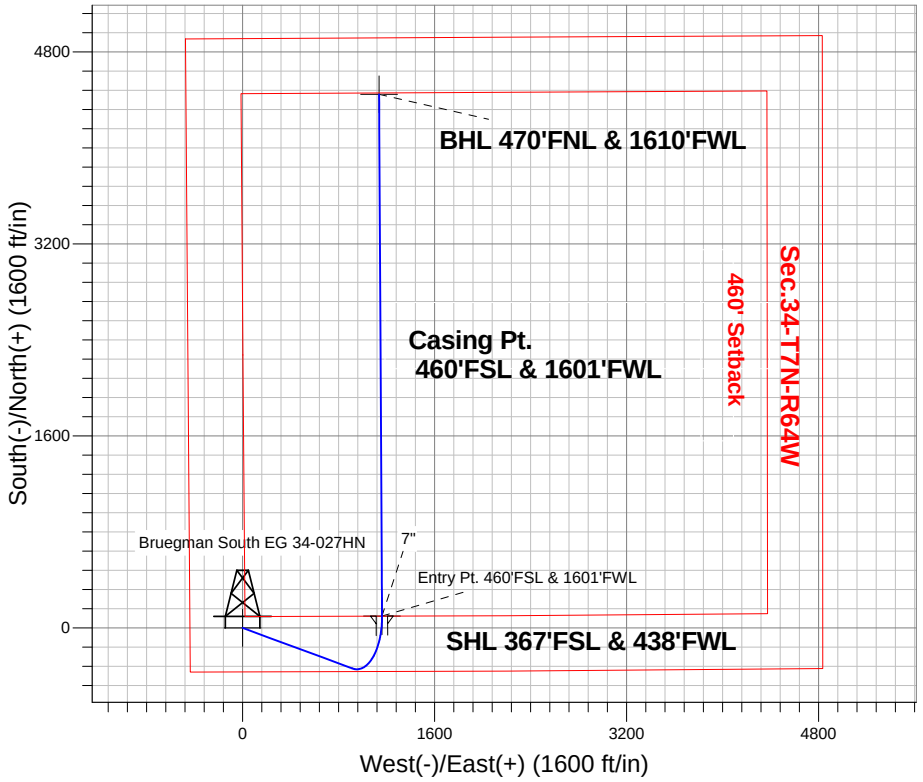

Azimuths to True North
Magnetic North: 8.43°

Magnetic Field
Strength: 52967.8snT
Dip Angle: 67.10°
Date: 11/1/2013
Model: IGRF2010

Bruegman South Pad Sec.34-T7N-R64W
Bruegman South EG 34-027HN
Plan #1 (11-1-13)
7:14, November 13 2013

## ANNOTATIONS

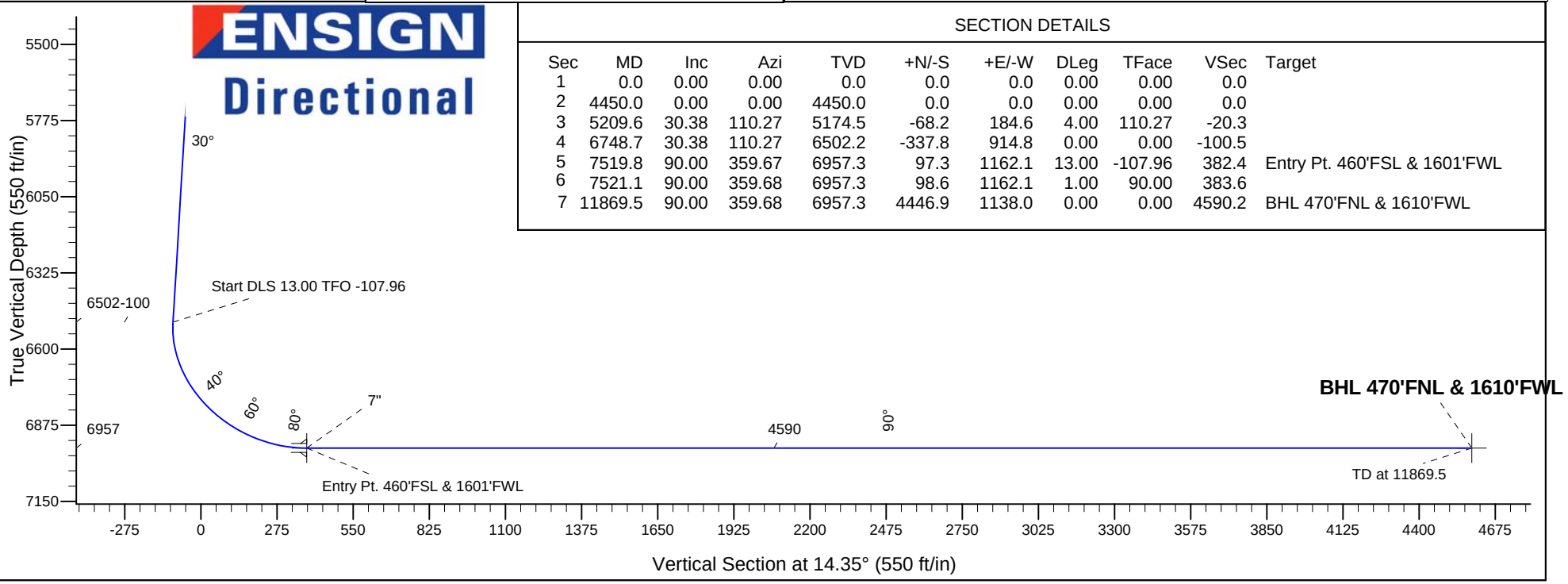
| TVD | MD | Annotation |
|---|---|---|
| 4450.0 | 4450.0 | KOP - Start Build 4.00 |
| 6502.2 | 6748.7 | Start DLS 13.00 TFO -107.96 |
| 6957.3 | 11869.5 | TD at 11869.5 |




ENSIGN Directional

## SECTION DETAILS

| Sec | MD | Inc | Azi | TVD | +N/-S | +E/-W | DLeg | TFace | VSec | Target |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.0 | |
| 2 | 4450.0 | 0.00 | 0.00 | 4450.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.0 | |
| 3 | 5209.6 | 30.38 | 110.27 | 5174.5 | -68.2 | 184.6 | 4.00 | 110.27 | -20.3 | |
| 4 | 6748.7 | 30.38 | 110.27 | 6502.2 | -337.8 | 914.8 | 0.00 | 0.00 | -100.5 | |
| 5 | 7519.8 | 90.00 | 359.67 | 6957.3 | 97.3 | 1162.1 | 13.00 | -107.96 | 382.4 | Entry Pt. 460'FSL & 1601'FWL |
| 6 | 7521.1 | 90.00 | 359.68 | 6957.3 | 98.6 | 1162.1 | 1.00 | 90.00 | 383.6 | |
| 7 | 11869.5 | 90.00 | 359.68 | 6957.3 | 4446.9 | 1138.0 | 0.00 | 0.00 | 4590.2 | BHL 470'FNL & 1610'FWL |



# Great Western

**SEC.34-T7N-R64W**
**Bruegman South Pad Sec.34-T7N-R64W**
**Bruegman South EG 34-027HN**

**Wellbore #1**

**Plan: Plan #1 (11-1-13)**

# Standard Planning Report

**13 November, 2013**

| | | | |
|---|---|---|---|
| **Database:** | Landmark | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Company:** | Great Western | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Project:** | SEC.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site:** | Bruegman South Pad Sec.34-T7N-R64W | **North Reference:** | True |
| **Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Wellbore #1 | | |
| **Design:** | Plan #1 (11-1-13) | | |

**Project** SEC.34-T7N-R64W, Weld County, Colorado

| | | | |
|---|---|---|---|
| **Map System:** | US State Plane 1983 | **System Datum:** | Mean Sea Level |
| **Geo Datum:** | North American Datum 1983 | | Using Well Reference Point |
| **Map Zone:** | Colorado Northern Zone | | Using geodetic scale factor |

**Site** Bruegman South Pad Sec.34-T7N-R64W

| | | | | | |
|---|---|---|---|---|---|
| **Site Position:** | | **Northing:** | 1,435,046.64 ft | **Latitude:** | 40.523675 |
| **From:** | Lat/Long | **Easting:** | 3,265,632.14 ft | **Longitude:** | -104.544478 |
| **Position Uncertainty:** | 0.0 ft | **Slot Radius:** | " | **Grid Convergence:** | 0.62 ° |

**Well** Bruegman South EG 34-027HN

| | | | | | | |
|---|---|---|---|---|---|---|
| **Well Position** | **+N/-S** | -72.9 ft | **Northing:** | 1,434,974.80 ft | **Latitude:** | 40.523475 |
| | **+E/-W** | 95.9 ft | **Easting:** | 3,265,728.83 ft | **Longitude:** | -104.544133 |
| **Position Uncertainty** | | 0.0 ft | **Wellhead Elevation:** | ft | **Ground Level:** | 4,844.8 ft |

**Wellbore** Wellbore #1

| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|---|---|---|---|---|---|
| | IGRF2010 | 11/1/2013 | 8.43 | 67.10 | 52,968 |

**Design** Plan #1 (11-1-13)

**Audit Notes:**

| | | | | | |
|---|---|---|---|---|---|
| **Version:** | | **Phase:** | PROTOTYPE | **Tie On Depth:** | 0.0 |

| Vertical Section: | Depth From (TVD) (ft) | +N/-S (ft) | +E/-W (ft) | Direction (°) |
|---|---|---|---|---|
| | 0.0 | 0.0 | 0.0 | 14.35 |

**Plan Sections**

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Turn Rate (°/100ft) | TFO (°) | Target |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 4,450.0 | 0.00 | 0.00 | 4,450.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 5,209.6 | 30.38 | 110.27 | 5,174.5 | -68.2 | 184.6 | 4.00 | 4.00 | 0.00 | 110.27 | |
| 6,748.7 | 30.38 | 110.27 | 6,502.2 | -337.8 | 914.8 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 7,519.8 | 90.00 | 359.67 | 6,957.3 | 97.3 | 1,162.1 | 13.00 | 7.73 | -14.34 | -107.96 | Entry Pt. 460'FSL & |
| 7,521.1 | 90.00 | 359.68 | 6,957.3 | 98.6 | 1,162.1 | 1.00 | 0.00 | 1.00 | 90.00 | |
| 11,869.5 | 90.00 | 359.68 | 6,957.3 | 4,446.9 | 1,138.0 | 0.00 | 0.00 | 0.00 | 0.00 | BHL 470'FNL & 161 |

| | | | |
|---|---|---|---|
| **Database:** | Landmark | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Company:** | Great Western | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Project:** | SEC.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site:** | Bruegman South Pad Sec.34-T7N-R64W | **North Reference:** | True |
| **Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Wellbore #1 | | |
| **Design:** | Plan #1 (11-1-13) | | |

**Planned Survey**

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Turn Rate (°/100ft) |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1.0 | 0.00 | 0.00 | 1.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| **SHL 367'FSL & 438'FWL** | | | | | | | | | |
| 100.0 | 0.00 | 0.00 | 100.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 200.0 | 0.00 | 0.00 | 200.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 300.0 | 0.00 | 0.00 | 300.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 400.0 | 0.00 | 0.00 | 400.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 500.0 | 0.00 | 0.00 | 500.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 600.0 | 0.00 | 0.00 | 600.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 700.0 | 0.00 | 0.00 | 700.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 800.0 | 0.00 | 0.00 | 800.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 900.0 | 0.00 | 0.00 | 900.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,000.0 | 0.00 | 0.00 | 1,000.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,100.0 | 0.00 | 0.00 | 1,100.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,200.0 | 0.00 | 0.00 | 1,200.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,300.0 | 0.00 | 0.00 | 1,300.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,400.0 | 0.00 | 0.00 | 1,400.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,500.0 | 0.00 | 0.00 | 1,500.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,600.0 | 0.00 | 0.00 | 1,600.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,700.0 | 0.00 | 0.00 | 1,700.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,800.0 | 0.00 | 0.00 | 1,800.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 1,900.0 | 0.00 | 0.00 | 1,900.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 2,000.0 | 0.00 | 0.00 | 2,000.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 2,100.0 | 0.00 | 0.00 | 2,100.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 2,200.0 | 0.00 | 0.00 | 2,200.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 2,300.0 | 0.00 | 0.00 | 2,300.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 2,400.0 | 0.00 | 0.00 | 2,400.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 2,500.0 | 0.00 | 0.00 | 2,500.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 2,600.0 | 0.00 | 0.00 | 2,600.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 2,700.0 | 0.00 | 0.00 | 2,700.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 2,800.0 | 0.00 | 0.00 | 2,800.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 2,900.0 | 0.00 | 0.00 | 2,900.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 3,000.0 | 0.00 | 0.00 | 3,000.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 3,100.0 | 0.00 | 0.00 | 3,100.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 3,200.0 | 0.00 | 0.00 | 3,200.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 3,300.0 | 0.00 | 0.00 | 3,300.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 3,400.0 | 0.00 | 0.00 | 3,400.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 3,500.0 | 0.00 | 0.00 | 3,500.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 3,600.0 | 0.00 | 0.00 | 3,600.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 3,700.0 | 0.00 | 0.00 | 3,700.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 3,800.0 | 0.00 | 0.00 | 3,800.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 3,900.0 | 0.00 | 0.00 | 3,900.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 4,000.0 | 0.00 | 0.00 | 4,000.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 4,100.0 | 0.00 | 0.00 | 4,100.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 4,200.0 | 0.00 | 0.00 | 4,200.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 4,300.0 | 0.00 | 0.00 | 4,300.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 4,400.0 | 0.00 | 0.00 | 4,400.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| 4,450.0 | 0.00 | 0.00 | 4,450.0 | 0.0 | 0.0 | 0.0 | 0.00 | 0.00 | 0.00 |
| **KOP - Start Build 4.00** | | | | | | | | | |
| 4,500.0 | 2.00 | 110.27 | 4,500.0 | -0.3 | 0.8 | -0.1 | 4.00 | 4.00 | 0.00 |
| 4,600.0 | 6.00 | 110.27 | 4,599.7 | -2.7 | 7.4 | -0.8 | 4.00 | 4.00 | 0.00 |
| 4,700.0 | 10.00 | 110.27 | 4,698.7 | -7.5 | 20.4 | -2.2 | 4.00 | 4.00 | 0.00 |
| 4,800.0 | 14.00 | 110.27 | 4,796.5 | -14.7 | 39.9 | -4.4 | 4.00 | 4.00 | 0.00 |
| 4,900.0 | 18.00 | 110.27 | 4,892.6 | -24.3 | 65.8 | -7.2 | 4.00 | 4.00 | 0.00 |

| | | | |
|---|---|---|---|
| **Database:** | Landmark | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Company:** | Great Western | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Project:** | SEC.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site:** | Bruegman South Pad Sec.34-T7N-R64W | **North Reference:** | True |
| **Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Wellbore #1 | | |
| **Design:** | Plan #1 (11-1-13) | | |

**Planned Survey**

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Turn Rate (°/100ft) |
|---|---|---|---|---|---|---|---|---|---|
| 5,000.0 | 22.00 | 110.27 | 4,986.6 | -36.1 | 97.8 | -10.7 | 4.00 | 4.00 | 0.00 |
| 5,100.0 | 26.00 | 110.27 | 5,077.9 | -50.2 | 136.0 | -14.9 | 4.00 | 4.00 | 0.00 |
| 5,200.0 | 30.00 | 110.27 | 5,166.2 | -66.5 | 180.0 | -19.8 | 4.00 | 4.00 | 0.00 |
| 5,209.6 | 30.38 | 110.27 | 5,174.5 | -68.2 | 184.6 | -20.3 | 4.00 | 4.00 | 0.00 |
| 5,300.0 | 30.38 | 110.27 | 5,252.5 | -84.0 | 227.4 | -25.0 | 0.00 | 0.00 | 0.00 |
| 5,400.0 | 30.38 | 110.27 | 5,338.7 | -101.5 | 274.9 | -30.2 | 0.00 | 0.00 | 0.00 |
| 5,500.0 | 30.38 | 110.27 | 5,425.0 | -119.0 | 322.3 | -35.4 | 0.00 | 0.00 | 0.00 |
| 5,600.0 | 30.38 | 110.27 | 5,511.3 | -136.6 | 369.8 | -40.6 | 0.00 | 0.00 | 0.00 |
| 5,700.0 | 30.38 | 110.27 | 5,597.5 | -154.1 | 417.2 | -45.8 | 0.00 | 0.00 | 0.00 |
| 5,800.0 | 30.38 | 110.27 | 5,683.8 | -171.6 | 464.7 | -51.0 | 0.00 | 0.00 | 0.00 |
| 5,900.0 | 30.38 | 110.27 | 5,770.1 | -189.1 | 512.1 | -56.3 | 0.00 | 0.00 | 0.00 |
| 6,000.0 | 30.38 | 110.27 | 5,856.3 | -206.6 | 559.6 | -61.5 | 0.00 | 0.00 | 0.00 |
| 6,100.0 | 30.38 | 110.27 | 5,942.6 | -224.2 | 607.0 | -66.7 | 0.00 | 0.00 | 0.00 |
| 6,200.0 | 30.38 | 110.27 | 6,028.9 | -241.7 | 654.5 | -71.9 | 0.00 | 0.00 | 0.00 |
| 6,300.0 | 30.38 | 110.27 | 6,115.1 | -259.2 | 701.9 | -77.1 | 0.00 | 0.00 | 0.00 |
| 6,400.0 | 30.38 | 110.27 | 6,201.4 | -276.7 | 749.4 | -82.3 | 0.00 | 0.00 | 0.00 |
| 6,500.0 | 30.38 | 110.27 | 6,287.7 | -294.3 | 796.8 | -87.5 | 0.00 | 0.00 | 0.00 |
| 6,600.0 | 30.38 | 110.27 | 6,373.9 | -311.8 | 844.3 | -92.7 | 0.00 | 0.00 | 0.00 |
| 6,700.0 | 30.38 | 110.27 | 6,460.2 | -329.3 | 891.7 | -97.9 | 0.00 | 0.00 | 0.00 |
| 6,748.7 | 30.38 | 110.27 | 6,502.2 | -337.8 | 914.8 | -100.5 | 0.00 | 0.00 | 0.00 |
| **Start DLS 13.00 TFO -107.96** | | | | | | | | | |
| 6,800.0 | 28.96 | 97.07 | 6,546.8 | -343.9 | 939.3 | -100.2 | 13.01 | -2.77 | -25.72 |
| 6,900.0 | 30.14 | 70.64 | 6,634.2 | -338.5 | 987.3 | -83.2 | 13.00 | 1.18 | -26.43 |
| 7,000.0 | 35.87 | 49.05 | 6,718.3 | -310.8 | 1,033.3 | -45.0 | 13.00 | 5.73 | -21.59 |
| 7,100.0 | 44.41 | 33.75 | 6,794.9 | -262.3 | 1,075.0 | 12.4 | 13.00 | 8.54 | -15.31 |
| 7,200.0 | 54.43 | 22.78 | 6,860.0 | -195.5 | 1,110.3 | 85.9 | 13.00 | 10.02 | -10.96 |
| 7,300.0 | 65.21 | 14.36 | 6,910.2 | -113.7 | 1,137.5 | 171.9 | 13.00 | 10.78 | -8.43 |
| 7,400.0 | 76.38 | 7.31 | 6,943.1 | -21.1 | 1,155.0 | 265.9 | 13.00 | 11.18 | -7.05 |
| 7,500.0 | 87.74 | 0.91 | 6,956.9 | 77.5 | 1,162.0 | 363.1 | 13.00 | 11.36 | -6.40 |
| 7,519.8 | 90.00 | 359.67 | 6,957.3 | 97.3 | 1,162.1 | 382.4 | 12.99 | 11.38 | -6.25 |
| **7" - Entry Pt. 460'FSL & 1601'FWL** | | | | | | | | | |
| 7,521.1 | 90.00 | 359.68 | 6,957.3 | 98.6 | 1,162.1 | 383.6 | 0.91 | 0.21 | 0.89 |
| 7,600.0 | 90.00 | 359.68 | 6,957.3 | 177.5 | 1,161.6 | 459.9 | 0.00 | 0.00 | 0.00 |
| 7,700.0 | 90.00 | 359.68 | 6,957.3 | 277.5 | 1,161.1 | 556.7 | 0.00 | 0.00 | 0.00 |
| 7,800.0 | 90.00 | 359.68 | 6,957.3 | 377.5 | 1,160.5 | 653.4 | 0.00 | 0.00 | 0.00 |
| 7,900.0 | 90.00 | 359.68 | 6,957.3 | 477.5 | 1,160.0 | 750.2 | 0.00 | 0.00 | 0.00 |
| 8,000.0 | 90.00 | 359.68 | 6,957.3 | 577.5 | 1,159.4 | 846.9 | 0.00 | 0.00 | 0.00 |
| 8,100.0 | 90.00 | 359.68 | 6,957.3 | 677.5 | 1,158.9 | 943.6 | 0.00 | 0.00 | 0.00 |
| 8,200.0 | 90.00 | 359.68 | 6,957.3 | 777.5 | 1,158.3 | 1,040.4 | 0.00 | 0.00 | 0.00 |
| 8,300.0 | 90.00 | 359.68 | 6,957.3 | 877.5 | 1,157.8 | 1,137.1 | 0.00 | 0.00 | 0.00 |
| 8,400.0 | 90.00 | 359.68 | 6,957.3 | 977.5 | 1,157.2 | 1,233.8 | 0.00 | 0.00 | 0.00 |
| 8,500.0 | 90.00 | 359.68 | 6,957.3 | 1,077.5 | 1,156.7 | 1,330.6 | 0.00 | 0.00 | 0.00 |
| 8,600.0 | 90.00 | 359.68 | 6,957.3 | 1,177.5 | 1,156.1 | 1,427.3 | 0.00 | 0.00 | 0.00 |
| 8,700.0 | 90.00 | 359.68 | 6,957.3 | 1,277.5 | 1,155.5 | 1,524.1 | 0.00 | 0.00 | 0.00 |
| 8,800.0 | 90.00 | 359.68 | 6,957.3 | 1,377.5 | 1,155.0 | 1,620.8 | 0.00 | 0.00 | 0.00 |
| 8,900.0 | 90.00 | 359.68 | 6,957.3 | 1,477.5 | 1,154.4 | 1,717.5 | 0.00 | 0.00 | 0.00 |
| 9,000.0 | 90.00 | 359.68 | 6,957.3 | 1,577.5 | 1,153.9 | 1,814.3 | 0.00 | 0.00 | 0.00 |
| 9,100.0 | 90.00 | 359.68 | 6,957.3 | 1,677.5 | 1,153.3 | 1,911.0 | 0.00 | 0.00 | 0.00 |
| 9,200.0 | 90.00 | 359.68 | 6,957.3 | 1,777.5 | 1,152.8 | 2,007.8 | 0.00 | 0.00 | 0.00 |
| 9,300.0 | 90.00 | 359.68 | 6,957.3 | 1,877.5 | 1,152.2 | 2,104.5 | 0.00 | 0.00 | 0.00 |
| 9,400.0 | 90.00 | 359.68 | 6,957.3 | 1,977.5 | 1,151.7 | 2,201.2 | 0.00 | 0.00 | 0.00 |
| 9,500.0 | 90.00 | 359.68 | 6,957.3 | 2,077.5 | 1,151.1 | 2,298.0 | 0.00 | 0.00 | 0.00 |
| 9,600.0 | 90.00 | 359.68 | 6,957.3 | 2,177.5 | 1,150.6 | 2,394.7 | 0.00 | 0.00 | 0.00 |
| 9,700.0 | 90.00 | 359.68 | 6,957.3 | 2,277.5 | 1,150.0 | 2,491.5 | 0.00 | 0.00 | 0.00 |

| | | | |
|---|---|---|---|
| **Database:** | Landmark | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Company:** | Great Western | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Project:** | SEC.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site:** | Bruegman South Pad Sec.34-T7N-R64W | **North Reference:** | True |
| **Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Wellbore:** | Wellbore #1 | | |
| **Design:** | Plan #1 (11-1-13) | | |

**Planned Survey**

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100ft) | Build Rate (°/100ft) | Turn Rate (°/100ft) |
|---|---|---|---|---|---|---|---|---|---|
| 9,800.0 | 90.00 | 359.68 | 6,957.3 | 2,377.5 | 1,149.4 | 2,588.2 | 0.00 | 0.00 | 0.00 |
| 9,900.0 | 90.00 | 359.68 | 6,957.3 | 2,477.5 | 1,148.9 | 2,684.9 | 0.00 | 0.00 | 0.00 |
| 10,000.0 | 90.00 | 359.68 | 6,957.3 | 2,577.5 | 1,148.3 | 2,781.7 | 0.00 | 0.00 | 0.00 |
| 10,100.0 | 90.00 | 359.68 | 6,957.3 | 2,677.5 | 1,147.8 | 2,878.4 | 0.00 | 0.00 | 0.00 |
| 10,200.0 | 90.00 | 359.68 | 6,957.3 | 2,777.4 | 1,147.2 | 2,975.2 | 0.00 | 0.00 | 0.00 |
| 10,300.0 | 90.00 | 359.68 | 6,957.3 | 2,877.4 | 1,146.7 | 3,071.9 | 0.00 | 0.00 | 0.00 |
| 10,400.0 | 90.00 | 359.68 | 6,957.3 | 2,977.4 | 1,146.1 | 3,168.6 | 0.00 | 0.00 | 0.00 |
| 10,500.0 | 90.00 | 359.68 | 6,957.3 | 3,077.4 | 1,145.6 | 3,265.4 | 0.00 | 0.00 | 0.00 |
| 10,600.0 | 90.00 | 359.68 | 6,957.3 | 3,177.4 | 1,145.0 | 3,362.1 | 0.00 | 0.00 | 0.00 |
| 10,700.0 | 90.00 | 359.68 | 6,957.3 | 3,277.4 | 1,144.5 | 3,458.9 | 0.00 | 0.00 | 0.00 |
| 10,800.0 | 90.00 | 359.68 | 6,957.3 | 3,377.4 | 1,143.9 | 3,555.6 | 0.00 | 0.00 | 0.00 |
| 10,900.0 | 90.00 | 359.68 | 6,957.3 | 3,477.4 | 1,143.4 | 3,652.3 | 0.00 | 0.00 | 0.00 |
| 11,000.0 | 90.00 | 359.68 | 6,957.3 | 3,577.4 | 1,142.8 | 3,749.1 | 0.00 | 0.00 | 0.00 |
| 11,100.0 | 90.00 | 359.68 | 6,957.3 | 3,677.4 | 1,142.2 | 3,845.8 | 0.00 | 0.00 | 0.00 |
| 11,200.0 | 90.00 | 359.68 | 6,957.3 | 3,777.4 | 1,141.7 | 3,942.6 | 0.00 | 0.00 | 0.00 |
| 11,300.0 | 90.00 | 359.68 | 6,957.3 | 3,877.4 | 1,141.1 | 4,039.3 | 0.00 | 0.00 | 0.00 |
| 11,400.0 | 90.00 | 359.68 | 6,957.3 | 3,977.4 | 1,140.6 | 4,136.0 | 0.00 | 0.00 | 0.00 |
| 11,500.0 | 90.00 | 359.68 | 6,957.3 | 4,077.4 | 1,140.0 | 4,232.8 | 0.00 | 0.00 | 0.00 |
| 11,600.0 | 90.00 | 359.68 | 6,957.3 | 4,177.4 | 1,139.5 | 4,329.5 | 0.00 | 0.00 | 0.00 |
| 11,700.0 | 90.00 | 359.68 | 6,957.3 | 4,277.4 | 1,138.9 | 4,426.2 | 0.00 | 0.00 | 0.00 |
| 11,800.0 | 90.00 | 359.68 | 6,957.3 | 4,377.4 | 1,138.4 | 4,523.0 | 0.00 | 0.00 | 0.00 |
| 11,869.5 | 90.00 | 359.68 | 6,957.3 | 4,446.9 | 1,138.0 | 4,590.2 | 0.00 | 0.00 | 0.00 |
| **TD at 11869.5 - BHL 470'FNL & 1610'FWL** | | | | | | | | | |

**Casing Points**

| Measured Depth (ft) | Vertical Depth (ft) | Name | Casing Diameter (") | Hole Diameter (") |
|---|---|---|---|---|
| 7,519.8 | 6,957.3 | 7" | 7 | 7-1/2 |

**Plan Annotations**

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates +N/-S (ft) | Local Coordinates +E/-W (ft) | Comment |
|---|---|---|---|---|
| 4,450.0 | 4,450.0 | 0.0 | 0.0 | KOP - Start Build 4.00 |
| 6,748.7 | 6,502.2 | -337.8 | 914.8 | Start DLS 13.00 TFO -107.96 |
| 11,869.5 | 6,957.3 | 4,446.9 | 1,138.0 | TD at 11869.5 |

ENSIGN
Directional

# Great Western

**SEC.34-T7N-R64W**
**Bruegman South Pad Sec.34-T7N-R64W**
**Bruegman South EG 34-027HN**

**Wellbore #1**
**Plan #1 (11-1-13)**

# Anticollision Report

**13 November, 2013**

| | | | |
|---|---|---|---|
| **Company:** | Great Western | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Project:** | SEC.34-T7N-R64W | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Reference Site:** | Bruegman South Pad Sec.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (11-1-13) | **Offset TVD Reference:** | Offset Datum |

**Reference** Plan #1 (11-1-13)

| | | | |
|---|---|---|---|
| **Filter type:** | NO GLOBAL FILTER: Using user defined selection & filtering criteria | | |
| **Interpolation Method:** | MD Interval 100.0ft | **Error Model:** | ISCWSA |
| **Depth Range:** | Unlimited | **Scan Method:** | Closest Approach 3D |
| **Results Limited by:** | Maximum center-center distance of 1,000.0ft | **Error Surface:** | Elliptical Conic |

**Warning Levels Evaluated at:** 2.00 **Sigma**

**Survey Tool Program** **Date** 11/1/2013

| From (ft) | To (ft) | Survey (Wellbore) | Tool Name | Description |
|---|---|---|---|---|
| 0.0 | 11,869.5 | Plan #1 (11-1-13) (Wellbore #1) | MWD | MWD - Standard |

**Summary**

| Site Name / Offset Well - Wellbore - Design | Reference Measured Depth (ft) | Offset Measured Depth (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|
| Bruegman South Pad Sec.34-T7N-R64W | | | | | | |
| Bruegman South EG 34-024HC - Wellbore #1 - Plan #1 ( | 4,400.0 | 4,400.0 | 60.3 | 40.8 | 3.085 | CC, ES |
| Bruegman South EG 34-024HC - Wellbore #1 - Plan #1 ( | 4,500.0 | 4,500.0 | 61.2 | 41.2 | 3.061 | SF |
| Bruegman South EG 34-024HN - Wellbore #1 - Plan #1 ( | 4,400.0 | 4,400.0 | 30.1 | 10.5 | 1.537 | CC, ES |
| Bruegman South EG 34-024HN - Wellbore #1 - Plan #1 ( | 4,427.9 | 4,427.9 | 30.2 | 10.5 | 1.534 | SF |
| Bruegman South EG 34-027HC - Wellbore #1 - Plan #1 ( | 4,200.0 | 4,200.0 | 30.1 | 11.4 | 1.611 | CC, ES, SF |
| Bruegman South EG 34-029HN - Wellbore #1 - Plan #1 ( | 3,500.0 | 3,500.0 | 60.1 | 44.6 | 3.876 | CC, ES |
| Bruegman South EG 34-029HN - Wellbore #1 - Plan #1 ( | 11,869.5 | 11,998.0 | 571.5 | 394.7 | 3.233 | SF |

**Offset Design** Bruegman South Pad Sec.34-T7N-R64W - Bruegman South EG 34-024HC - Wellbore #1 - Plan #1 (11-

**Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD

**Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -52.86 | 36.4 | -48.1 | 60.3 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | -52.86 | 36.4 | -48.1 | 60.3 | 60.1 | 0.22 | 268.421 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | -52.86 | 36.4 | -48.1 | 60.3 | 59.7 | 0.67 | 89.474 | |
| 300.0 | 300.0 | 300.0 | 300.0 | 0.6 | 0.6 | -52.86 | 36.4 | -48.1 | 60.3 | 59.2 | 1.12 | 53.684 | |
| 400.0 | 400.0 | 400.0 | 400.0 | 0.8 | 0.8 | -52.86 | 36.4 | -48.1 | 60.3 | 58.8 | 1.57 | 38.346 | |
| 500.0 | 500.0 | 500.0 | 500.0 | 1.0 | 1.0 | -52.86 | 36.4 | -48.1 | 60.3 | 58.3 | 2.02 | 29.825 | |
| 600.0 | 600.0 | 600.0 | 600.0 | 1.2 | 1.2 | -52.86 | 36.4 | -48.1 | 60.3 | 57.9 | 2.47 | 24.402 | |
| 700.0 | 700.0 | 700.0 | 700.0 | 1.5 | 1.5 | -52.86 | 36.4 | -48.1 | 60.3 | 57.4 | 2.92 | 20.648 | |
| 800.0 | 800.0 | 800.0 | 800.0 | 1.7 | 1.7 | -52.86 | 36.4 | -48.1 | 60.3 | 57.0 | 3.37 | 17.895 | |
| 900.0 | 900.0 | 900.0 | 900.0 | 1.9 | 1.9 | -52.86 | 36.4 | -48.1 | 60.3 | 56.5 | 3.82 | 15.789 | |
| 1,000.0 | 1,000.0 | 1,000.0 | 1,000.0 | 2.1 | 2.1 | -52.86 | 36.4 | -48.1 | 60.3 | 56.1 | 4.27 | 14.127 | |
| 1,100.0 | 1,100.0 | 1,100.0 | 1,100.0 | 2.4 | 2.4 | -52.86 | 36.4 | -48.1 | 60.3 | 55.6 | 4.72 | 12.782 | |
| 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 2.6 | 2.6 | -52.86 | 36.4 | -48.1 | 60.3 | 55.2 | 5.17 | 11.670 | |
| 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 2.8 | 2.8 | -52.86 | 36.4 | -48.1 | 60.3 | 54.7 | 5.62 | 10.737 | |
| 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 3.0 | 3.0 | -52.86 | 36.4 | -48.1 | 60.3 | 54.3 | 6.07 | 9.942 | |
| 1,500.0 | 1,500.0 | 1,500.0 | 1,500.0 | 3.3 | 3.3 | -52.86 | 36.4 | -48.1 | 60.3 | 53.8 | 6.52 | 9.256 | |
| 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 | 3.5 | 3.5 | -52.86 | 36.4 | -48.1 | 60.3 | 53.4 | 6.97 | 8.659 | |
| 1,700.0 | 1,700.0 | 1,700.0 | 1,700.0 | 3.7 | 3.7 | -52.86 | 36.4 | -48.1 | 60.3 | 52.9 | 7.42 | 8.134 | |
| 1,800.0 | 1,800.0 | 1,800.0 | 1,800.0 | 3.9 | 3.9 | -52.86 | 36.4 | -48.1 | 60.3 | 52.5 | 7.87 | 7.669 | |
| 1,900.0 | 1,900.0 | 1,900.0 | 1,900.0 | 4.2 | 4.2 | -52.86 | 36.4 | -48.1 | 60.3 | 52.0 | 8.32 | 7.255 | |
| 2,000.0 | 2,000.0 | 2,000.0 | 2,000.0 | 4.4 | 4.4 | -52.86 | 36.4 | -48.1 | 60.3 | 51.6 | 8.77 | 6.883 | |

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

| | | | |
|---|---|---|---|
| **Company:** | Great Western | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Project:** | SEC.34-T7N-R64W | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Reference Site:** | Bruegman South Pad Sec.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (11-1-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Bruegman South Pad Sec.34-T7N-R64W - Bruegman South EG 34-024HC - Wellbore #1 - Plan #1 (11- **Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD **Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,100.0 | 2,100.0 | 2,100.0 | 2,100.0 | 4.6 | 4.6 | -52.86 | 36.4 | -48.1 | 60.3 | 51.1 | 9.22 | 6.547 | |
| 2,200.0 | 2,200.0 | 2,200.0 | 2,200.0 | 4.8 | 4.8 | -52.86 | 36.4 | -48.1 | 60.3 | 50.7 | 9.66 | 6.242 | |
| 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 5.1 | 5.1 | -52.86 | 36.4 | -48.1 | 60.3 | 50.2 | 10.11 | 5.965 | |
| 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 5.3 | 5.3 | -52.86 | 36.4 | -48.1 | 60.3 | 49.8 | 10.56 | 5.711 | |
| 2,500.0 | 2,500.0 | 2,500.0 | 2,500.0 | 5.5 | 5.5 | -52.86 | 36.4 | -48.1 | 60.3 | 49.3 | 11.01 | 5.478 | |
| 2,600.0 | 2,600.0 | 2,600.0 | 2,600.0 | 5.7 | 5.7 | -52.86 | 36.4 | -48.1 | 60.3 | 48.9 | 11.46 | 5.263 | |
| 2,700.0 | 2,700.0 | 2,700.0 | 2,700.0 | 6.0 | 6.0 | -52.86 | 36.4 | -48.1 | 60.3 | 48.4 | 11.91 | 5.065 | |
| 2,800.0 | 2,800.0 | 2,800.0 | 2,800.0 | 6.2 | 6.2 | -52.86 | 36.4 | -48.1 | 60.3 | 48.0 | 12.36 | 4.880 | |
| 2,900.0 | 2,900.0 | 2,900.0 | 2,900.0 | 6.4 | 6.4 | -52.86 | 36.4 | -48.1 | 60.3 | 47.5 | 12.81 | 4.709 | |
| 3,000.0 | 3,000.0 | 3,000.0 | 3,000.0 | 6.6 | 6.6 | -52.86 | 36.4 | -48.1 | 60.3 | 47.1 | 13.26 | 4.550 | |
| 3,100.0 | 3,100.0 | 3,100.0 | 3,100.0 | 6.9 | 6.9 | -52.86 | 36.4 | -48.1 | 60.3 | 46.6 | 13.71 | 4.400 | |
| 3,200.0 | 3,200.0 | 3,200.0 | 3,200.0 | 7.1 | 7.1 | -52.86 | 36.4 | -48.1 | 60.3 | 46.2 | 14.16 | 4.261 | |
| 3,300.0 | 3,300.0 | 3,300.0 | 3,300.0 | 7.3 | 7.3 | -52.86 | 36.4 | -48.1 | 60.3 | 45.7 | 14.61 | 4.130 | |
| 3,400.0 | 3,400.0 | 3,400.0 | 3,400.0 | 7.5 | 7.5 | -52.86 | 36.4 | -48.1 | 60.3 | 45.3 | 15.06 | 4.006 | |
| 3,500.0 | 3,500.0 | 3,500.0 | 3,500.0 | 7.8 | 7.8 | -52.86 | 36.4 | -48.1 | 60.3 | 44.8 | 15.51 | 3.890 | |
| 3,600.0 | 3,600.0 | 3,600.0 | 3,600.0 | 8.0 | 8.0 | -52.86 | 36.4 | -48.1 | 60.3 | 44.4 | 15.96 | 3.781 | |
| 3,700.0 | 3,700.0 | 3,700.0 | 3,700.0 | 8.2 | 8.2 | -52.86 | 36.4 | -48.1 | 60.3 | 43.9 | 16.41 | 3.677 | |
| 3,800.0 | 3,800.0 | 3,800.0 | 3,800.0 | 8.4 | 8.4 | -52.86 | 36.4 | -48.1 | 60.3 | 43.5 | 16.86 | 3.579 | |
| 3,900.0 | 3,900.0 | 3,900.0 | 3,900.0 | 8.7 | 8.7 | -52.86 | 36.4 | -48.1 | 60.3 | 43.0 | 17.31 | 3.486 | |
| 4,000.0 | 4,000.0 | 4,000.0 | 4,000.0 | 8.9 | 8.9 | -52.86 | 36.4 | -48.1 | 60.3 | 42.6 | 17.76 | 3.398 | |
| 4,100.0 | 4,100.0 | 4,100.0 | 4,100.0 | 9.1 | 9.1 | -52.86 | 36.4 | -48.1 | 60.3 | 42.1 | 18.21 | 3.314 | |
| 4,200.0 | 4,200.0 | 4,200.0 | 4,200.0 | 9.3 | 9.3 | -52.86 | 36.4 | -48.1 | 60.3 | 41.7 | 18.66 | 3.234 | |
| 4,300.0 | 4,300.0 | 4,300.0 | 4,300.0 | 9.6 | 9.6 | -52.86 | 36.4 | -48.1 | 60.3 | 41.2 | 19.11 | 3.158 | |
| 4,400.0 | 4,400.0 | 4,400.0 | 4,400.0 | 9.8 | 9.8 | -52.86 | 36.4 | -48.1 | 60.3 | 40.8 | 19.55 | 3.085 | CC, ES |
| 4,427.8 | 4,427.8 | 4,427.8 | 4,427.8 | 9.8 | 9.8 | -163.17 | 36.4 | -48.1 | 60.5 | 40.8 | 19.68 | 3.073 | |
| 4,500.0 | 4,500.0 | 4,500.0 | 4,500.0 | 10.0 | 10.0 | -163.36 | 36.4 | -48.1 | 61.2 | 41.2 | 19.98 | 3.061 | SF |
| 4,600.0 | 4,599.7 | 4,599.7 | 4,599.7 | 10.2 | 10.2 | -164.97 | 36.4 | -48.1 | 67.9 | 47.6 | 20.32 | 3.341 | |
| 4,700.0 | 4,698.7 | 4,698.7 | 4,698.7 | 10.4 | 10.4 | -167.39 | 36.4 | -48.1 | 81.4 | 60.8 | 20.57 | 3.958 | |
| 4,800.0 | 4,796.5 | 4,796.5 | 4,796.5 | 10.6 | 10.7 | -169.80 | 36.4 | -48.1 | 101.8 | 81.1 | 20.72 | 4.913 | |
| 4,900.0 | 4,892.6 | 4,892.6 | 4,892.6 | 10.9 | 10.9 | -171.81 | 36.4 | -48.1 | 129.0 | 108.2 | 20.79 | 6.208 | |
| 5,000.0 | 4,986.6 | 4,986.6 | 4,986.6 | 11.2 | 11.1 | -173.35 | 36.4 | -48.1 | 163.0 | 142.2 | 20.76 | 7.851 | |
| 5,100.0 | 5,077.9 | 5,077.9 | 5,077.9 | 11.5 | 11.3 | -174.51 | 36.4 | -48.1 | 203.5 | 182.8 | 20.64 | 9.855 | |
| 5,200.0 | 5,166.2 | 5,168.3 | 5,168.3 | 12.0 | 11.5 | -175.40 | 36.4 | -48.0 | 250.2 | 229.7 | 20.45 | 12.235 | |
| 5,300.0 | 5,252.5 | 5,268.8 | 5,268.7 | 12.6 | 11.7 | -176.63 | 33.5 | -45.8 | 297.9 | 277.1 | 20.76 | 14.349 | |
| 5,400.0 | 5,338.7 | 5,373.8 | 5,373.3 | 13.3 | 11.9 | -178.05 | 26.1 | -40.1 | 341.6 | 320.4 | 21.15 | 16.149 | |
| 5,500.0 | 5,425.0 | 5,483.3 | 5,481.6 | 14.0 | 12.1 | -179.65 | 13.5 | -30.3 | 381.0 | 359.4 | 21.57 | 17.665 | |
| 5,600.0 | 5,511.3 | 5,596.5 | 5,592.4 | 14.8 | 12.3 | 178.54 | -4.6 | -16.3 | 416.0 | 393.9 | 22.02 | 18.893 | |
| 5,700.0 | 5,597.5 | 5,712.9 | 5,704.8 | 15.6 | 12.6 | 176.51 | -28.7 | 2.4 | 446.5 | 424.0 | 22.52 | 19.830 | |
| 5,800.0 | 5,683.8 | 5,831.8 | 5,817.4 | 16.4 | 12.9 | 174.22 | -58.7 | 25.7 | 472.6 | 449.5 | 23.08 | 20.471 | |
| 5,900.0 | 5,770.1 | 5,952.2 | 5,928.8 | 17.3 | 13.3 | 171.65 | -94.8 | 53.6 | 494.3 | 470.6 | 23.76 | 20.807 | |
| 6,000.0 | 5,856.3 | 6,056.5 | 6,023.3 | 18.2 | 13.7 | 169.29 | -129.6 | 80.6 | 513.0 | 488.5 | 24.49 | 20.949 | |
| 6,100.0 | 5,942.6 | 6,152.8 | 6,110.4 | 19.2 | 14.1 | 167.23 | -162.1 | 105.8 | 532.2 | 507.0 | 25.28 | 21.050 | |
| 6,200.0 | 6,028.9 | 6,249.1 | 6,197.6 | 20.1 | 14.6 | 165.31 | -194.5 | 130.9 | 552.1 | 525.9 | 26.16 | 21.102 | |
| 6,300.0 | 6,115.1 | 6,345.4 | 6,284.7 | 21.1 | 15.1 | 163.52 | -227.0 | 156.1 | 572.5 | 545.4 | 27.12 | 21.108 | |
| 6,400.0 | 6,201.4 | 6,441.8 | 6,371.8 | 22.1 | 15.6 | 161.86 | -259.4 | 181.2 | 593.4 | 565.2 | 28.16 | 21.074 | |
| 6,500.0 | 6,287.7 | 6,538.1 | 6,459.0 | 23.1 | 16.2 | 160.30 | -291.9 | 206.4 | 614.8 | 585.5 | 29.27 | 21.006 | |
| 6,600.0 | 6,373.9 | 6,634.6 | 6,546.3 | 24.1 | 16.8 | 158.86 | -324.3 | 231.6 | 636.6 | 606.1 | 30.44 | 20.914 | |
| 6,700.0 | 6,460.2 | 6,734.8 | 6,640.2 | 25.2 | 17.3 | 158.61 | -345.4 | 258.6 | 658.4 | 627.1 | 31.33 | 21.015 | |
| 6,800.0 | 6,546.8 | 6,832.1 | 6,733.6 | 26.1 | 17.6 | 173.00 | -344.2 | 285.3 | 680.1 | 648.8 | 31.34 | 21.699 | |
| 6,900.0 | 6,634.2 | 6,925.0 | 6,820.5 | 26.9 | 17.8 | -159.58 | -323.3 | 310.1 | 702.5 | 671.4 | 31.08 | 22.606 | |
| 7,000.0 | 6,718.3 | 7,016.2 | 6,899.8 | 27.6 | 17.8 | -137.43 | -284.8 | 332.6 | 724.3 | 693.2 | 31.14 | 23.260 | |
| 7,100.0 | 6,794.9 | 7,105.1 | 6,968.3 | 28.1 | 17.8 | -122.25 | -231.7 | 351.8 | 744.3 | 712.8 | 31.51 | 23.619 | |

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

| | | | |
|---|---|---|---|
| **Company:** | Great Western | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Project:** | SEC.34-T7N-R64W | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Reference Site:** | Bruegman South Pad Sec.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (11-1-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Bruegman South Pad Sec.34-T7N-R64W - Bruegman South EG 34-024HC - Wellbore #1 - Plan #1 (11- **Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD **Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7,200.0 | 6,860.0 | 7,192.8 | 7,024.5 | 28.4 | 17.7 | -112.31 | -166.4 | 367.5 | 761.4 | 729.4 | 32.05 | 23.761 | |
| 7,300.0 | 6,910.2 | 7,279.7 | 7,066.9 | 28.6 | 17.6 | -105.99 | -91.6 | 379.1 | 774.7 | 742.0 | 32.63 | 23.739 | |
| 7,400.0 | 6,943.1 | 7,366.3 | 7,094.3 | 28.7 | 17.5 | -102.36 | -10.0 | 386.5 | 783.3 | 750.0 | 33.28 | 23.534 | |
| 7,500.0 | 6,956.9 | 7,452.6 | 7,105.9 | 28.7 | 17.4 | -100.95 | 75.4 | 389.2 | 787.0 | 752.9 | 34.07 | 23.099 | |
| 7,600.0 | 6,957.3 | 7,549.9 | 7,106.3 | 28.7 | 17.3 | -100.91 | 172.6 | 388.7 | 787.2 | 752.4 | 34.80 | 22.619 | |
| 7,700.0 | 6,957.3 | 7,649.9 | 7,106.3 | 28.7 | 17.8 | -100.91 | 272.6 | 388.1 | 787.2 | 751.3 | 35.95 | 21.897 | |
| 7,800.0 | 6,957.3 | 7,749.9 | 7,106.3 | 28.8 | 18.5 | -100.91 | 372.6 | 387.5 | 787.3 | 749.9 | 37.45 | 21.020 | |
| 7,900.0 | 6,957.3 | 7,849.9 | 7,106.3 | 29.0 | 19.5 | -100.91 | 472.6 | 386.8 | 787.4 | 748.1 | 39.27 | 20.052 | |
| 8,000.0 | 6,957.3 | 7,949.9 | 7,106.3 | 29.3 | 20.6 | -100.91 | 572.6 | 386.2 | 787.5 | 746.1 | 41.35 | 19.044 | |
| 8,100.0 | 6,957.3 | 8,049.9 | 7,106.3 | 29.8 | 21.8 | -100.91 | 672.6 | 385.6 | 787.5 | 743.9 | 43.66 | 18.037 | |
| 8,200.0 | 6,957.3 | 8,149.9 | 7,106.3 | 30.3 | 23.1 | -100.91 | 772.6 | 385.0 | 787.6 | 741.4 | 46.17 | 17.058 | |
| 8,300.0 | 6,957.3 | 8,249.9 | 7,106.3 | 31.0 | 24.4 | -100.90 | 872.6 | 384.3 | 787.7 | 738.8 | 48.85 | 16.125 | |
| 8,400.0 | 6,957.3 | 8,349.9 | 7,106.3 | 31.9 | 25.9 | -100.90 | 972.6 | 383.7 | 787.7 | 736.1 | 51.66 | 15.248 | |
| 8,500.0 | 6,957.3 | 8,449.9 | 7,106.3 | 32.8 | 27.3 | -100.90 | 1,072.6 | 383.1 | 787.8 | 733.2 | 54.60 | 14.430 | |
| 8,600.0 | 6,957.3 | 8,549.9 | 7,106.3 | 33.9 | 28.9 | -100.90 | 1,172.6 | 382.4 | 787.9 | 730.3 | 57.63 | 13.672 | |
| 8,700.0 | 6,957.3 | 8,649.9 | 7,106.3 | 35.1 | 30.5 | -100.90 | 1,272.6 | 381.8 | 788.0 | 727.2 | 60.75 | 12.971 | |
| 8,800.0 | 6,957.3 | 8,749.9 | 7,106.3 | 36.4 | 32.1 | -100.90 | 1,372.6 | 381.2 | 788.0 | 724.1 | 63.94 | 12.325 | |
| 8,900.0 | 6,957.3 | 8,849.9 | 7,106.3 | 37.8 | 33.7 | -100.90 | 1,472.6 | 380.6 | 788.1 | 720.9 | 67.19 | 11.729 | |
| 9,000.0 | 6,957.3 | 8,949.9 | 7,106.3 | 39.2 | 35.4 | -100.90 | 1,572.6 | 379.9 | 788.2 | 717.7 | 70.50 | 11.179 | |
| 9,100.0 | 6,957.3 | 9,049.9 | 7,106.3 | 40.7 | 37.1 | -100.90 | 1,672.6 | 379.3 | 788.3 | 714.4 | 73.86 | 10.673 | |
| 9,200.0 | 6,957.3 | 9,149.9 | 7,106.3 | 42.2 | 38.8 | -100.89 | 1,772.6 | 378.7 | 788.3 | 711.1 | 77.25 | 10.204 | |
| 9,300.0 | 6,957.3 | 9,249.9 | 7,106.3 | 43.8 | 40.6 | -100.89 | 1,872.6 | 378.0 | 788.4 | 707.7 | 80.68 | 9.772 | |
| 9,400.0 | 6,957.3 | 9,349.9 | 7,106.3 | 45.4 | 42.3 | -100.89 | 1,972.6 | 377.4 | 788.5 | 704.3 | 84.15 | 9.370 | |
| 9,500.0 | 6,957.3 | 9,449.9 | 7,106.3 | 47.1 | 44.1 | -100.89 | 2,072.6 | 376.8 | 788.5 | 700.9 | 87.63 | 8.998 | |
| 9,600.0 | 6,957.3 | 9,549.9 | 7,106.3 | 48.7 | 45.9 | -100.89 | 2,172.6 | 376.2 | 788.6 | 697.5 | 91.15 | 8.652 | |
| 9,700.0 | 6,957.3 | 9,649.9 | 7,106.3 | 50.4 | 47.7 | -100.89 | 2,272.6 | 375.5 | 788.7 | 694.0 | 94.68 | 8.330 | |
| 9,800.0 | 6,957.3 | 9,749.9 | 7,106.3 | 52.1 | 49.5 | -100.89 | 2,372.6 | 374.9 | 788.8 | 690.5 | 98.24 | 8.029 | |
| 9,900.0 | 6,957.3 | 9,849.9 | 7,106.3 | 53.8 | 51.3 | -100.89 | 2,472.6 | 374.3 | 788.8 | 687.0 | 101.81 | 7.748 | |
| 10,000.0 | 6,957.3 | 9,949.9 | 7,106.3 | 55.5 | 53.1 | -100.89 | 2,572.6 | 373.6 | 788.9 | 683.5 | 105.40 | 7.485 | |
| 10,100.0 | 6,957.3 | 10,049.9 | 7,106.3 | 57.3 | 54.9 | -100.89 | 2,672.6 | 373.0 | 789.0 | 680.0 | 109.00 | 7.239 | |
| 10,200.0 | 6,957.3 | 10,149.9 | 7,106.3 | 59.0 | 56.8 | -100.88 | 2,772.6 | 372.4 | 789.1 | 676.4 | 112.61 | 7.007 | |
| 10,300.0 | 6,957.3 | 10,249.9 | 7,106.3 | 60.8 | 58.6 | -100.88 | 2,872.6 | 371.8 | 789.1 | 672.9 | 116.23 | 6.789 | |
| 10,400.0 | 6,957.3 | 10,349.9 | 7,106.3 | 62.6 | 60.5 | -100.88 | 2,972.6 | 371.1 | 789.2 | 669.3 | 119.87 | 6.584 | |
| 10,500.0 | 6,957.3 | 10,449.9 | 7,106.3 | 64.4 | 62.3 | -100.88 | 3,072.6 | 370.5 | 789.3 | 665.8 | 123.51 | 6.390 | |
| 10,600.0 | 6,957.3 | 10,549.9 | 7,106.3 | 66.2 | 64.2 | -100.88 | 3,172.6 | 369.9 | 789.3 | 662.2 | 127.17 | 6.207 | |
| 10,700.0 | 6,957.3 | 10,649.9 | 7,106.3 | 68.0 | 66.0 | -100.88 | 3,272.6 | 369.2 | 789.4 | 658.6 | 130.83 | 6.034 | |
| 10,800.0 | 6,957.3 | 10,749.9 | 7,106.3 | 69.8 | 67.9 | -100.88 | 3,372.6 | 368.6 | 789.5 | 655.0 | 134.50 | 5.870 | |
| 10,900.0 | 6,957.3 | 10,849.9 | 7,106.3 | 71.6 | 69.7 | -100.88 | 3,472.6 | 368.0 | 789.6 | 651.4 | 138.17 | 5.714 | |
| 11,000.0 | 6,957.3 | 10,949.9 | 7,106.3 | 73.4 | 71.6 | -100.88 | 3,572.6 | 367.4 | 789.6 | 647.8 | 141.85 | 5.567 | |
| 11,100.0 | 6,957.3 | 11,049.9 | 7,106.3 | 75.3 | 73.5 | -100.88 | 3,672.6 | 366.7 | 789.7 | 644.2 | 145.54 | 5.426 | |
| 11,200.0 | 6,957.3 | 11,149.9 | 7,106.3 | 77.1 | 75.4 | -100.87 | 3,772.6 | 366.1 | 789.8 | 640.6 | 149.23 | 5.292 | |
| 11,300.0 | 6,957.3 | 11,249.9 | 7,106.3 | 78.9 | 77.2 | -100.87 | 3,872.6 | 365.5 | 789.9 | 636.9 | 152.93 | 5.165 | |
| 11,400.0 | 6,957.3 | 11,349.9 | 7,106.3 | 80.8 | 79.1 | -100.87 | 3,972.6 | 364.8 | 789.9 | 633.3 | 156.63 | 5.043 | |
| 11,500.0 | 6,957.3 | 11,449.9 | 7,106.3 | 82.6 | 81.0 | -100.87 | 4,072.6 | 364.2 | 790.0 | 629.7 | 160.34 | 4.927 | |
| 11,600.0 | 6,957.3 | 11,549.9 | 7,106.3 | 84.5 | 82.9 | -100.87 | 4,172.6 | 363.6 | 790.1 | 626.0 | 164.05 | 4.816 | |
| 11,700.0 | 6,957.3 | 11,649.9 | 7,106.3 | 86.3 | 84.8 | -100.87 | 4,272.6 | 363.0 | 790.1 | 622.4 | 167.76 | 4.710 | |
| 11,800.0 | 6,957.3 | 11,749.9 | 7,106.3 | 88.2 | 86.6 | -100.87 | 4,372.5 | 362.3 | 790.2 | 618.7 | 171.48 | 4.608 | |
| 11,869.5 | 6,957.3 | 11,819.1 | 7,106.3 | 89.5 | 87.9 | -100.87 | 4,441.8 | 361.9 | 790.3 | 616.2 | 174.06 | 4.540 | |

| | | | |
|---|---|---|---|
| **Company:** | Great Western | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Project:** | SEC.34-T7N-R64W | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Reference Site:** | Bruegman South Pad Sec.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (11-1-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Bruegman South Pad Sec.34-T7N-R64W - Bruegman South EG 34-024HN - Wellbore #1 - Plan #1 (11- **Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD **Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -52.70 | 18.2 | -23.9 | 30.1 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | -52.70 | 18.2 | -23.9 | 30.1 | 29.8 | 0.22 | 133.729 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | -52.70 | 18.2 | -23.9 | 30.1 | 29.4 | 0.67 | 44.576 | |
| 300.0 | 300.0 | 300.0 | 300.0 | 0.6 | 0.6 | -52.70 | 18.2 | -23.9 | 30.1 | 28.9 | 1.12 | 26.746 | |
| 400.0 | 400.0 | 400.0 | 400.0 | 0.8 | 0.8 | -52.70 | 18.2 | -23.9 | 30.1 | 28.5 | 1.57 | 19.104 | |
| 500.0 | 500.0 | 500.0 | 500.0 | 1.0 | 1.0 | -52.70 | 18.2 | -23.9 | 30.1 | 28.0 | 2.02 | 14.859 | |
| 600.0 | 600.0 | 600.0 | 600.0 | 1.2 | 1.2 | -52.70 | 18.2 | -23.9 | 30.1 | 27.6 | 2.47 | 12.157 | |
| 700.0 | 700.0 | 700.0 | 700.0 | 1.5 | 1.5 | -52.70 | 18.2 | -23.9 | 30.1 | 27.1 | 2.92 | 10.287 | |
| 800.0 | 800.0 | 800.0 | 800.0 | 1.7 | 1.7 | -52.70 | 18.2 | -23.9 | 30.1 | 26.7 | 3.37 | 8.915 | |
| 900.0 | 900.0 | 900.0 | 900.0 | 1.9 | 1.9 | -52.70 | 18.2 | -23.9 | 30.1 | 26.2 | 3.82 | 7.866 | |
| 1,000.0 | 1,000.0 | 1,000.0 | 1,000.0 | 2.1 | 2.1 | -52.70 | 18.2 | -23.9 | 30.1 | 25.8 | 4.27 | 7.038 | |
| 1,100.0 | 1,100.0 | 1,100.0 | 1,100.0 | 2.4 | 2.4 | -52.70 | 18.2 | -23.9 | 30.1 | 25.3 | 4.72 | 6.368 | |
| 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 2.6 | 2.6 | -52.70 | 18.2 | -23.9 | 30.1 | 24.9 | 5.17 | 5.814 | |
| 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 2.8 | 2.8 | -52.70 | 18.2 | -23.9 | 30.1 | 24.4 | 5.62 | 5.349 | |
| 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 3.0 | 3.0 | -52.70 | 18.2 | -23.9 | 30.1 | 24.0 | 6.07 | 4.953 | |
| 1,500.0 | 1,500.0 | 1,500.0 | 1,500.0 | 3.3 | 3.3 | -52.70 | 18.2 | -23.9 | 30.1 | 23.5 | 6.52 | 4.611 | |
| 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 | 3.5 | 3.5 | -52.70 | 18.2 | -23.9 | 30.1 | 23.1 | 6.97 | 4.314 | |
| 1,700.0 | 1,700.0 | 1,700.0 | 1,700.0 | 3.7 | 3.7 | -52.70 | 18.2 | -23.9 | 30.1 | 22.6 | 7.42 | 4.052 | |
| 1,800.0 | 1,800.0 | 1,800.0 | 1,800.0 | 3.9 | 3.9 | -52.70 | 18.2 | -23.9 | 30.1 | 22.2 | 7.87 | 3.821 | |
| 1,900.0 | 1,900.0 | 1,900.0 | 1,900.0 | 4.2 | 4.2 | -52.70 | 18.2 | -23.9 | 30.1 | 21.7 | 8.32 | 3.614 | |
| 2,000.0 | 2,000.0 | 2,000.0 | 2,000.0 | 4.4 | 4.4 | -52.70 | 18.2 | -23.9 | 30.1 | 21.3 | 8.77 | 3.429 | |
| 2,100.0 | 2,100.0 | 2,100.0 | 2,100.0 | 4.6 | 4.6 | -52.70 | 18.2 | -23.9 | 30.1 | 20.8 | 9.22 | 3.262 | |
| 2,200.0 | 2,200.0 | 2,200.0 | 2,200.0 | 4.8 | 4.8 | -52.70 | 18.2 | -23.9 | 30.1 | 20.4 | 9.66 | 3.110 | |
| 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 5.1 | 5.1 | -52.70 | 18.2 | -23.9 | 30.1 | 19.9 | 10.11 | 2.972 | |
| 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 5.3 | 5.3 | -52.70 | 18.2 | -23.9 | 30.1 | 19.5 | 10.56 | 2.845 | |
| 2,500.0 | 2,500.0 | 2,500.0 | 2,500.0 | 5.5 | 5.5 | -52.70 | 18.2 | -23.9 | 30.1 | 19.0 | 11.01 | 2.729 | |
| 2,600.0 | 2,600.0 | 2,600.0 | 2,600.0 | 5.7 | 5.7 | -52.70 | 18.2 | -23.9 | 30.1 | 18.6 | 11.46 | 2.622 | |
| 2,700.0 | 2,700.0 | 2,700.0 | 2,700.0 | 6.0 | 6.0 | -52.70 | 18.2 | -23.9 | 30.1 | 18.1 | 11.91 | 2.523 | |
| 2,800.0 | 2,800.0 | 2,800.0 | 2,800.0 | 6.2 | 6.2 | -52.70 | 18.2 | -23.9 | 30.1 | 17.7 | 12.36 | 2.431 | |
| 2,900.0 | 2,900.0 | 2,900.0 | 2,900.0 | 6.4 | 6.4 | -52.70 | 18.2 | -23.9 | 30.1 | 17.2 | 12.81 | 2.346 | |
| 3,000.0 | 3,000.0 | 3,000.0 | 3,000.0 | 6.6 | 6.6 | -52.70 | 18.2 | -23.9 | 30.1 | 16.8 | 13.26 | 2.267 | |
| 3,100.0 | 3,100.0 | 3,100.0 | 3,100.0 | 6.9 | 6.9 | -52.70 | 18.2 | -23.9 | 30.1 | 16.3 | 13.71 | 2.192 | |
| 3,200.0 | 3,200.0 | 3,200.0 | 3,200.0 | 7.1 | 7.1 | -52.70 | 18.2 | -23.9 | 30.1 | 15.9 | 14.16 | 2.123 | |
| 3,300.0 | 3,300.0 | 3,300.0 | 3,300.0 | 7.3 | 7.3 | -52.70 | 18.2 | -23.9 | 30.1 | 15.4 | 14.61 | 2.057 | |
| 3,400.0 | 3,400.0 | 3,400.0 | 3,400.0 | 7.5 | 7.5 | -52.70 | 18.2 | -23.9 | 30.1 | 15.0 | 15.06 | 1.996 | |
| 3,500.0 | 3,500.0 | 3,500.0 | 3,500.0 | 7.8 | 7.8 | -52.70 | 18.2 | -23.9 | 30.1 | 14.5 | 15.51 | 1.938 | |
| 3,600.0 | 3,600.0 | 3,600.0 | 3,600.0 | 8.0 | 8.0 | -52.70 | 18.2 | -23.9 | 30.1 | 14.1 | 15.96 | 1.884 | |
| 3,700.0 | 3,700.0 | 3,700.0 | 3,700.0 | 8.2 | 8.2 | -52.70 | 18.2 | -23.9 | 30.1 | 13.6 | 16.41 | 1.832 | |
| 3,800.0 | 3,800.0 | 3,800.0 | 3,800.0 | 8.4 | 8.4 | -52.70 | 18.2 | -23.9 | 30.1 | 13.2 | 16.86 | 1.783 | |
| 3,900.0 | 3,900.0 | 3,900.0 | 3,900.0 | 8.7 | 8.7 | -52.70 | 18.2 | -23.9 | 30.1 | 12.8 | 17.31 | 1.737 | |
| 4,000.0 | 4,000.0 | 4,000.0 | 4,000.0 | 8.9 | 8.9 | -52.70 | 18.2 | -23.9 | 30.1 | 12.3 | 17.76 | 1.693 | |
| 4,100.0 | 4,100.0 | 4,100.0 | 4,100.0 | 9.1 | 9.1 | -52.70 | 18.2 | -23.9 | 30.1 | 11.9 | 18.21 | 1.651 | |
| 4,200.0 | 4,200.0 | 4,200.0 | 4,200.0 | 9.3 | 9.3 | -52.70 | 18.2 | -23.9 | 30.1 | 11.4 | 18.66 | 1.611 | |
| 4,300.0 | 4,300.0 | 4,300.0 | 4,300.0 | 9.6 | 9.6 | -52.70 | 18.2 | -23.9 | 30.1 | 11.0 | 19.11 | 1.573 | |
| 4,400.0 | 4,400.0 | 4,400.0 | 4,400.0 | 9.8 | 9.8 | -52.70 | 18.2 | -23.9 | 30.1 | 10.5 | 19.55 | 1.537 | CC, ES |
| 4,427.9 | 4,427.9 | 4,427.9 | 4,427.9 | 9.8 | 9.8 | -163.04 | 18.2 | -23.9 | 30.2 | 10.5 | 19.68 | 1.534 | SF |
| 4,500.0 | 4,500.0 | 4,500.0 | 4,500.0 | 10.0 | 10.0 | -163.43 | 18.2 | -23.9 | 30.9 | 10.9 | 19.98 | 1.546 | |
| 4,600.0 | 4,599.7 | 4,599.7 | 4,599.7 | 10.2 | 10.2 | -166.40 | 18.2 | -23.9 | 37.6 | 17.3 | 20.32 | 1.852 | |
| 4,700.0 | 4,698.7 | 4,698.7 | 4,698.7 | 10.4 | 10.4 | -169.96 | 18.2 | -23.9 | 51.3 | 30.7 | 20.56 | 2.493 | |
| 4,800.0 | 4,796.5 | 4,796.5 | 4,796.5 | 10.6 | 10.7 | -172.75 | 18.2 | -23.9 | 71.8 | 51.1 | 20.71 | 3.468 | |
| 4,900.0 | 4,892.6 | 4,892.6 | 4,892.6 | 10.9 | 10.9 | -174.65 | 18.2 | -23.9 | 99.2 | 78.5 | 20.77 | 4.777 | |
| 5,000.0 | 4,986.6 | 4,986.6 | 4,986.6 | 11.2 | 11.1 | -175.92 | 18.2 | -23.9 | 133.3 | 112.6 | 20.74 | 6.427 | |

| | | | |
|---|---|---|---|
| **Company:** | Great Western | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Project:** | SEC.34-T7N-R64W | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Reference Site:** | Bruegman South Pad Sec.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (11-1-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Bruegman South Pad Sec.34-T7N-R64W - Bruegman South EG 34-024HN - Wellbore #1 - Plan #1 (11- | **Offset Site Error:** 0.0 ft | **Offset Well Error:** 0.0 ft

**Survey Program:** 0-MWD

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,100.0 | 5,077.9 | 5,084.3 | 5,084.3 | 11.5 | 11.3 | -176.99 | 17.3 | -22.8 | 172.7 | 152.0 | 20.62 | 8.373 | |
| 5,200.0 | 5,166.2 | 5,184.9 | 5,184.7 | 12.0 | 11.5 | -178.24 | 13.0 | -17.9 | 214.0 | 193.6 | 20.41 | 10.489 | |
| 5,300.0 | 5,252.5 | 5,288.1 | 5,287.2 | 12.6 | 11.7 | -179.60 | 4.9 | -8.7 | 254.7 | 233.9 | 20.73 | 12.286 | |
| 5,400.0 | 5,338.7 | 5,395.6 | 5,393.0 | 13.3 | 11.9 | 178.96 | -7.3 | 5.4 | 290.7 | 269.5 | 21.14 | 13.748 | |
| 5,500.0 | 5,425.0 | 5,507.0 | 5,501.4 | 14.0 | 12.1 | 177.40 | -24.0 | 24.6 | 321.8 | 300.2 | 21.59 | 14.902 | |
| 5,600.0 | 5,511.3 | 5,621.7 | 5,611.3 | 14.8 | 12.4 | 175.65 | -45.6 | 49.3 | 347.8 | 325.7 | 22.08 | 15.749 | |
| 5,700.0 | 5,597.5 | 5,738.9 | 5,721.3 | 15.6 | 12.8 | 173.67 | -72.0 | 79.7 | 368.7 | 346.1 | 22.64 | 16.289 | |
| 5,800.0 | 5,683.8 | 5,857.9 | 5,830.3 | 16.4 | 13.2 | 171.42 | -103.4 | 115.7 | 384.6 | 361.3 | 23.28 | 16.518 | |
| 5,900.0 | 5,770.1 | 5,977.7 | 5,936.8 | 17.3 | 13.8 | 168.83 | -139.4 | 157.0 | 395.4 | 371.4 | 24.05 | 16.440 | |
| 6,000.0 | 5,856.3 | 6,082.1 | 6,027.4 | 18.2 | 14.4 | 166.35 | -173.5 | 196.3 | 402.9 | 378.0 | 24.91 | 16.176 | |
| 6,100.0 | 5,942.6 | 6,180.5 | 6,112.5 | 19.2 | 15.0 | 164.09 | -205.9 | 233.4 | 410.8 | 385.0 | 25.86 | 15.890 | |
| 6,200.0 | 6,028.9 | 6,278.8 | 6,197.6 | 20.1 | 15.7 | 161.91 | -238.2 | 270.5 | 419.4 | 392.5 | 26.92 | 15.580 | |
| 6,300.0 | 6,115.1 | 6,377.2 | 6,282.8 | 21.1 | 16.4 | 159.82 | -270.5 | 307.7 | 428.6 | 400.5 | 28.10 | 15.250 | |
| 6,400.0 | 6,201.4 | 6,475.5 | 6,367.9 | 22.1 | 17.1 | 157.81 | -302.9 | 344.8 | 438.3 | 408.9 | 29.40 | 14.909 | |
| 6,500.0 | 6,287.7 | 6,577.7 | 6,457.0 | 23.1 | 17.9 | 156.09 | -334.5 | 383.6 | 448.3 | 417.6 | 30.75 | 14.582 | |
| 6,600.0 | 6,373.9 | 6,686.1 | 6,555.4 | 24.1 | 18.5 | 157.06 | -346.8 | 426.4 | 456.9 | 425.5 | 31.40 | 14.554 | |
| 6,700.0 | 6,460.2 | 6,785.4 | 6,645.7 | 25.2 | 19.0 | 160.73 | -334.8 | 465.5 | 464.9 | 433.7 | 31.18 | 14.910 | |
| 6,800.0 | 6,546.8 | 6,870.0 | 6,719.1 | 26.1 | 19.2 | 177.78 | -307.4 | 497.1 | 476.0 | 445.5 | 30.52 | 15.598 | |
| 6,900.0 | 6,634.2 | 6,947.6 | 6,781.1 | 26.9 | 19.4 | -153.13 | -269.3 | 523.7 | 491.1 | 460.8 | 30.32 | 16.198 | |
| 7,000.0 | 6,718.3 | 7,021.2 | 6,833.4 | 27.6 | 19.4 | -129.57 | -222.7 | 546.1 | 508.3 | 477.5 | 30.80 | 16.501 | |
| 7,100.0 | 6,794.9 | 7,092.0 | 6,876.4 | 28.1 | 19.4 | -113.26 | -169.6 | 564.4 | 525.3 | 493.8 | 31.54 | 16.655 | |
| 7,200.0 | 6,860.0 | 7,160.8 | 6,910.2 | 28.4 | 19.4 | -102.47 | -111.4 | 578.7 | 540.6 | 508.5 | 32.14 | 16.819 | |
| 7,300.0 | 6,910.2 | 7,225.0 | 6,933.9 | 28.6 | 19.4 | -95.62 | -52.7 | 588.6 | 552.8 | 520.3 | 32.51 | 17.004 | |
| 7,400.0 | 6,943.1 | 7,295.2 | 6,950.6 | 28.7 | 19.3 | -91.59 | 15.0 | 595.3 | 560.9 | 528.0 | 32.87 | 17.061 | |
| 7,500.0 | 6,956.9 | 7,361.5 | 6,957.1 | 28.7 | 19.3 | -90.04 | 81.0 | 597.7 | 564.3 | 530.8 | 33.49 | 16.848 | |
| 7,600.0 | 6,957.3 | 7,454.2 | 6,957.3 | 28.7 | 19.3 | -90.00 | 173.6 | 597.2 | 564.5 | 530.3 | 34.21 | 16.499 | |
| 7,700.0 | 6,957.3 | 7,554.2 | 6,957.3 | 28.7 | 19.5 | -90.00 | 273.6 | 596.5 | 564.6 | 529.3 | 35.34 | 15.978 | |
| 7,800.0 | 6,957.3 | 7,654.2 | 6,957.3 | 28.8 | 19.9 | -90.00 | 373.6 | 595.8 | 564.7 | 527.9 | 36.83 | 15.333 | |
| 7,900.0 | 6,957.3 | 7,754.2 | 6,957.3 | 29.0 | 20.6 | -90.00 | 473.6 | 595.1 | 564.8 | 526.2 | 38.65 | 14.614 | |
| 8,000.0 | 6,957.3 | 7,854.2 | 6,957.3 | 29.3 | 21.5 | -90.00 | 573.6 | 594.5 | 565.0 | 524.2 | 40.76 | 13.862 | |
| 8,100.0 | 6,957.3 | 7,954.2 | 6,957.3 | 29.8 | 22.6 | -90.00 | 673.6 | 593.8 | 565.1 | 522.0 | 43.10 | 13.110 | |
| 8,200.0 | 6,957.3 | 8,054.2 | 6,957.3 | 30.3 | 23.9 | -90.00 | 773.6 | 593.1 | 565.2 | 519.6 | 45.66 | 12.380 | |
| 8,300.0 | 6,957.3 | 8,154.2 | 6,957.3 | 31.0 | 25.2 | -90.00 | 873.6 | 592.4 | 565.3 | 517.0 | 48.38 | 11.686 | |
| 8,400.0 | 6,957.3 | 8,254.2 | 6,957.3 | 31.9 | 26.6 | -90.00 | 973.6 | 591.7 | 565.5 | 514.2 | 51.25 | 11.034 | |
| 8,500.0 | 6,957.3 | 8,354.2 | 6,957.3 | 32.8 | 28.0 | -90.00 | 1,073.6 | 591.1 | 565.6 | 511.4 | 54.24 | 10.428 | |
| 8,600.0 | 6,957.3 | 8,454.2 | 6,957.3 | 33.9 | 29.5 | -90.00 | 1,173.6 | 590.4 | 565.7 | 508.4 | 57.33 | 9.867 | |
| 8,700.0 | 6,957.3 | 8,554.2 | 6,957.3 | 35.1 | 31.1 | -90.00 | 1,273.6 | 589.7 | 565.9 | 505.3 | 60.51 | 9.351 | |
| 8,800.0 | 6,957.3 | 8,654.2 | 6,957.3 | 36.4 | 32.7 | -90.00 | 1,373.6 | 589.0 | 566.0 | 502.2 | 63.77 | 8.875 | |
| 8,900.0 | 6,957.3 | 8,754.2 | 6,957.3 | 37.8 | 34.3 | -90.00 | 1,473.6 | 588.3 | 566.1 | 499.0 | 67.09 | 8.438 | |
| 9,000.0 | 6,957.3 | 8,854.2 | 6,957.3 | 39.2 | 36.0 | -90.00 | 1,573.6 | 587.7 | 566.2 | 495.8 | 70.46 | 8.036 | |
| 9,100.0 | 6,957.3 | 8,954.2 | 6,957.3 | 40.7 | 37.6 | -90.00 | 1,673.6 | 587.0 | 566.4 | 492.5 | 73.88 | 7.666 | |
| 9,200.0 | 6,957.3 | 9,054.2 | 6,957.3 | 42.2 | 39.4 | -90.00 | 1,773.6 | 586.3 | 566.5 | 489.1 | 77.34 | 7.325 | |
| 9,300.0 | 6,957.3 | 9,154.2 | 6,957.3 | 43.8 | 41.1 | -90.00 | 1,873.6 | 585.6 | 566.6 | 485.8 | 80.83 | 7.010 | |
| 9,400.0 | 6,957.3 | 9,254.2 | 6,957.3 | 45.4 | 42.8 | -90.00 | 1,973.6 | 584.9 | 566.7 | 482.4 | 84.36 | 6.718 | |
| 9,500.0 | 6,957.3 | 9,354.2 | 6,957.3 | 47.1 | 44.6 | -90.00 | 2,073.6 | 584.3 | 566.9 | 478.9 | 87.91 | 6.448 | |
| 9,600.0 | 6,957.3 | 9,454.2 | 6,957.3 | 48.7 | 46.3 | -90.00 | 2,173.6 | 583.6 | 567.0 | 475.5 | 91.49 | 6.197 | |
| 9,700.0 | 6,957.3 | 9,554.2 | 6,957.3 | 50.4 | 48.1 | -90.00 | 2,273.6 | 582.9 | 567.1 | 472.0 | 95.09 | 5.964 | |
| 9,800.0 | 6,957.3 | 9,654.2 | 6,957.3 | 52.1 | 49.9 | -90.00 | 2,373.6 | 582.2 | 567.2 | 468.5 | 98.71 | 5.747 | |
| 9,900.0 | 6,957.3 | 9,754.2 | 6,957.3 | 53.8 | 51.7 | -90.00 | 2,473.6 | 581.5 | 567.4 | 465.0 | 102.34 | 5.544 | |
| 10,000.0 | 6,957.3 | 9,854.2 | 6,957.3 | 55.5 | 53.5 | -90.00 | 2,573.6 | 580.9 | 567.5 | 461.5 | 105.99 | 5.354 | |
| 10,100.0 | 6,957.3 | 9,954.2 | 6,957.3 | 57.3 | 55.3 | -90.00 | 2,673.6 | 580.2 | 567.6 | 458.0 | 109.66 | 5.176 | |
| 10,200.0 | 6,957.3 | 10,054.2 | 6,957.3 | 59.0 | 57.2 | -90.00 | 2,773.6 | 579.5 | 567.7 | 454.4 | 113.33 | 5.009 | |

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

| | | | |
|---|---|---|---|
| **Company:** | Great Western | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Project:** | SEC.34-T7N-R64W | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Reference Site:** | Bruegman South Pad Sec.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (11-1-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Bruegman South Pad Sec.34-T7N-R64W - Bruegman South EG 34-024HN - Wellbore #1 - Plan #1 (11- | **Offset Site Error:** 0.0 ft | **Offset Well Error:** 0.0 ft

**Survey Program:** 0-MWD

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10,300.0 | 6,957.3 | 10,154.2 | 6,957.3 | 60.8 | 59.0 | -90.00 | 2,873.6 | 578.8 | 567.9 | 450.8 | 117.02 | 4.853 | |
| 10,400.0 | 6,957.3 | 10,254.2 | 6,957.3 | 62.6 | 60.8 | -90.00 | 2,973.6 | 578.1 | 568.0 | 447.3 | 120.72 | 4.705 | |
| 10,500.0 | 6,957.3 | 10,354.2 | 6,957.3 | 64.4 | 62.7 | -90.00 | 3,073.6 | 577.5 | 568.1 | 443.7 | 124.43 | 4.566 | |
| 10,600.0 | 6,957.3 | 10,454.2 | 6,957.3 | 66.2 | 64.5 | -90.00 | 3,173.6 | 576.8 | 568.2 | 440.1 | 128.14 | 4.435 | |
| 10,700.0 | 6,957.3 | 10,554.2 | 6,957.3 | 68.0 | 66.4 | -90.00 | 3,273.6 | 576.1 | 568.4 | 436.5 | 131.86 | 4.310 | |
| 10,800.0 | 6,957.3 | 10,654.2 | 6,957.3 | 69.8 | 68.2 | -90.00 | 3,373.6 | 575.4 | 568.5 | 432.9 | 135.60 | 4.193 | |
| 10,900.0 | 6,957.3 | 10,754.2 | 6,957.3 | 71.6 | 70.1 | -90.00 | 3,473.6 | 574.7 | 568.6 | 429.3 | 139.33 | 4.081 | |
| 11,000.0 | 6,957.3 | 10,854.2 | 6,957.3 | 73.4 | 71.9 | -90.00 | 3,573.6 | 574.1 | 568.7 | 425.7 | 143.08 | 3.975 | |
| 11,100.0 | 6,957.3 | 10,954.2 | 6,957.3 | 75.3 | 73.8 | -90.00 | 3,673.6 | 573.4 | 568.9 | 422.1 | 146.82 | 3.875 | |
| 11,200.0 | 6,957.3 | 11,054.2 | 6,957.3 | 77.1 | 75.7 | -90.00 | 3,773.6 | 572.7 | 569.0 | 418.4 | 150.58 | 3.779 | |
| 11,300.0 | 6,957.3 | 11,154.2 | 6,957.3 | 78.9 | 77.5 | -90.00 | 3,873.6 | 572.0 | 569.1 | 414.8 | 154.34 | 3.688 | |
| 11,400.0 | 6,957.3 | 11,254.2 | 6,957.3 | 80.8 | 79.4 | -90.00 | 3,973.6 | 571.3 | 569.3 | 411.2 | 158.10 | 3.601 | |
| 11,500.0 | 6,957.3 | 11,354.2 | 6,957.3 | 82.6 | 81.3 | -90.00 | 4,073.6 | 570.7 | 569.4 | 407.5 | 161.87 | 3.518 | |
| 11,600.0 | 6,957.3 | 11,454.2 | 6,957.3 | 84.5 | 83.2 | -90.00 | 4,173.6 | 570.0 | 569.5 | 403.9 | 165.64 | 3.438 | |
| 11,700.0 | 6,957.3 | 11,554.2 | 6,957.3 | 86.3 | 85.1 | -90.00 | 4,273.6 | 569.3 | 569.6 | 400.2 | 169.41 | 3.362 | |
| 11,800.0 | 6,957.3 | 11,654.2 | 6,957.3 | 88.2 | 86.9 | -90.00 | 4,373.5 | 568.6 | 569.8 | 396.6 | 173.19 | 3.290 | |
| 11,869.5 | 6,957.3 | 11,723.2 | 6,957.3 | 89.5 | 88.2 | -90.00 | 4,442.5 | 568.2 | 569.8 | 394.0 | 175.81 | 3.241 | |

| | | | |
|---|---|---|---|
| **Company:** | Great Western | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Project:** | SEC.34-T7N-R64W | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Reference Site:** | Bruegman South Pad Sec.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (11-1-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Bruegman South Pad Sec.34-T7N-R64W - Bruegman South EG 34-027HC - Wellbore #1 - Plan #1 (11- **Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD **Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 127.30 | -18.2 | 23.9 | 30.1 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | 127.30 | -18.2 | 23.9 | 30.1 | 29.8 | 0.22 | 133.718 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | 127.30 | -18.2 | 23.9 | 30.1 | 29.4 | 0.67 | 44.573 | |
| 300.0 | 300.0 | 300.0 | 300.0 | 0.6 | 0.6 | 127.30 | -18.2 | 23.9 | 30.1 | 28.9 | 1.12 | 26.744 | |
| 400.0 | 400.0 | 400.0 | 400.0 | 0.8 | 0.8 | 127.30 | -18.2 | 23.9 | 30.1 | 28.5 | 1.57 | 19.103 | |
| 500.0 | 500.0 | 500.0 | 500.0 | 1.0 | 1.0 | 127.30 | -18.2 | 23.9 | 30.1 | 28.0 | 2.02 | 14.858 | |
| 600.0 | 600.0 | 600.0 | 600.0 | 1.2 | 1.2 | 127.30 | -18.2 | 23.9 | 30.1 | 27.6 | 2.47 | 12.156 | |
| 700.0 | 700.0 | 700.0 | 700.0 | 1.5 | 1.5 | 127.30 | -18.2 | 23.9 | 30.1 | 27.1 | 2.92 | 10.286 | |
| 800.0 | 800.0 | 800.0 | 800.0 | 1.7 | 1.7 | 127.30 | -18.2 | 23.9 | 30.1 | 26.7 | 3.37 | 8.915 | |
| 900.0 | 900.0 | 900.0 | 900.0 | 1.9 | 1.9 | 127.30 | -18.2 | 23.9 | 30.1 | 26.2 | 3.82 | 7.866 | |
| 1,000.0 | 1,000.0 | 1,000.0 | 1,000.0 | 2.1 | 2.1 | 127.30 | -18.2 | 23.9 | 30.1 | 25.8 | 4.27 | 7.038 | |
| 1,100.0 | 1,100.0 | 1,100.0 | 1,100.0 | 2.4 | 2.4 | 127.30 | -18.2 | 23.9 | 30.1 | 25.3 | 4.72 | 6.368 | |
| 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 2.6 | 2.6 | 127.30 | -18.2 | 23.9 | 30.1 | 24.9 | 5.17 | 5.814 | |
| 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 2.8 | 2.8 | 127.30 | -18.2 | 23.9 | 30.1 | 24.4 | 5.62 | 5.349 | |
| 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 3.0 | 3.0 | 127.30 | -18.2 | 23.9 | 30.1 | 24.0 | 6.07 | 4.953 | |
| 1,500.0 | 1,500.0 | 1,500.0 | 1,500.0 | 3.3 | 3.3 | 127.30 | -18.2 | 23.9 | 30.1 | 23.5 | 6.52 | 4.611 | |
| 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 | 3.5 | 3.5 | 127.30 | -18.2 | 23.9 | 30.1 | 23.1 | 6.97 | 4.313 | |
| 1,700.0 | 1,700.0 | 1,700.0 | 1,700.0 | 3.7 | 3.7 | 127.30 | -18.2 | 23.9 | 30.1 | 22.6 | 7.42 | 4.052 | |
| 1,800.0 | 1,800.0 | 1,800.0 | 1,800.0 | 3.9 | 3.9 | 127.30 | -18.2 | 23.9 | 30.1 | 22.2 | 7.87 | 3.821 | |
| 1,900.0 | 1,900.0 | 1,900.0 | 1,900.0 | 4.2 | 4.2 | 127.30 | -18.2 | 23.9 | 30.1 | 21.7 | 8.32 | 3.614 | |
| 2,000.0 | 2,000.0 | 2,000.0 | 2,000.0 | 4.4 | 4.4 | 127.30 | -18.2 | 23.9 | 30.1 | 21.3 | 8.77 | 3.429 | |
| 2,100.0 | 2,100.0 | 2,100.0 | 2,100.0 | 4.6 | 4.6 | 127.30 | -18.2 | 23.9 | 30.1 | 20.8 | 9.22 | 3.261 | |
| 2,200.0 | 2,200.0 | 2,200.0 | 2,200.0 | 4.8 | 4.8 | 127.30 | -18.2 | 23.9 | 30.1 | 20.4 | 9.66 | 3.110 | |
| 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 5.1 | 5.1 | 127.30 | -18.2 | 23.9 | 30.1 | 19.9 | 10.11 | 2.972 | |
| 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 5.3 | 5.3 | 127.30 | -18.2 | 23.9 | 30.1 | 19.5 | 10.56 | 2.845 | |
| 2,500.0 | 2,500.0 | 2,500.0 | 2,500.0 | 5.5 | 5.5 | 127.30 | -18.2 | 23.9 | 30.1 | 19.0 | 11.01 | 2.729 | |
| 2,600.0 | 2,600.0 | 2,600.0 | 2,600.0 | 5.7 | 5.7 | 127.30 | -18.2 | 23.9 | 30.1 | 18.6 | 11.46 | 2.622 | |
| 2,700.0 | 2,700.0 | 2,700.0 | 2,700.0 | 6.0 | 6.0 | 127.30 | -18.2 | 23.9 | 30.1 | 18.1 | 11.91 | 2.523 | |
| 2,800.0 | 2,800.0 | 2,800.0 | 2,800.0 | 6.2 | 6.2 | 127.30 | -18.2 | 23.9 | 30.1 | 17.7 | 12.36 | 2.431 | |
| 2,900.0 | 2,900.0 | 2,900.0 | 2,900.0 | 6.4 | 6.4 | 127.30 | -18.2 | 23.9 | 30.1 | 17.2 | 12.81 | 2.346 | |
| 3,000.0 | 3,000.0 | 3,000.0 | 3,000.0 | 6.6 | 6.6 | 127.30 | -18.2 | 23.9 | 30.1 | 16.8 | 13.26 | 2.266 | |
| 3,100.0 | 3,100.0 | 3,100.0 | 3,100.0 | 6.9 | 6.9 | 127.30 | -18.2 | 23.9 | 30.1 | 16.3 | 13.71 | 2.192 | |
| 3,200.0 | 3,200.0 | 3,200.0 | 3,200.0 | 7.1 | 7.1 | 127.30 | -18.2 | 23.9 | 30.1 | 15.9 | 14.16 | 2.123 | |
| 3,300.0 | 3,300.0 | 3,300.0 | 3,300.0 | 7.3 | 7.3 | 127.30 | -18.2 | 23.9 | 30.1 | 15.4 | 14.61 | 2.057 | |
| 3,400.0 | 3,400.0 | 3,400.0 | 3,400.0 | 7.5 | 7.5 | 127.30 | -18.2 | 23.9 | 30.1 | 15.0 | 15.06 | 1.996 | |
| 3,500.0 | 3,500.0 | 3,500.0 | 3,500.0 | 7.8 | 7.8 | 127.30 | -18.2 | 23.9 | 30.1 | 14.5 | 15.51 | 1.938 | |
| 3,600.0 | 3,600.0 | 3,600.0 | 3,600.0 | 8.0 | 8.0 | 127.30 | -18.2 | 23.9 | 30.1 | 14.1 | 15.96 | 1.883 | |
| 3,700.0 | 3,700.0 | 3,700.0 | 3,700.0 | 8.2 | 8.2 | 127.30 | -18.2 | 23.9 | 30.1 | 13.6 | 16.41 | 1.832 | |
| 3,800.0 | 3,800.0 | 3,800.0 | 3,800.0 | 8.4 | 8.4 | 127.30 | -18.2 | 23.9 | 30.1 | 13.2 | 16.86 | 1.783 | |
| 3,900.0 | 3,900.0 | 3,900.0 | 3,900.0 | 8.7 | 8.7 | 127.30 | -18.2 | 23.9 | 30.1 | 12.7 | 17.31 | 1.737 | |
| 4,000.0 | 4,000.0 | 4,000.0 | 4,000.0 | 8.9 | 8.9 | 127.30 | -18.2 | 23.9 | 30.1 | 12.3 | 17.76 | 1.693 | |
| 4,100.0 | 4,100.0 | 4,100.0 | 4,100.0 | 9.1 | 9.1 | 127.30 | -18.2 | 23.9 | 30.1 | 11.8 | 18.21 | 1.651 | |
| 4,200.0 | 4,200.0 | 4,200.0 | 4,200.0 | 9.3 | 9.3 | 127.30 | -18.2 | 23.9 | 30.1 | 11.4 | 18.66 | 1.611 | CC, ES, SF |
| 4,300.0 | 4,300.0 | 4,298.5 | 4,298.4 | 9.6 | 9.5 | 125.68 | -18.9 | 26.3 | 32.5 | 13.4 | 19.08 | 1.702 | |
| 4,400.0 | 4,400.0 | 4,396.4 | 4,396.1 | 9.8 | 9.7 | 122.04 | -21.0 | 33.6 | 39.8 | 20.3 | 19.50 | 2.043 | |
| 4,500.0 | 4,500.0 | 4,493.5 | 4,492.3 | 10.0 | 9.9 | 8.11 | -24.5 | 45.5 | 51.4 | 31.5 | 19.89 | 2.585 | |
| 4,600.0 | 4,599.7 | 4,590.0 | 4,587.3 | 10.2 | 10.1 | 5.56 | -29.3 | 62.0 | 62.0 | 41.9 | 20.17 | 3.074 | |
| 4,700.0 | 4,698.7 | 4,686.3 | 4,681.1 | 10.4 | 10.4 | 3.60 | -35.4 | 83.0 | 70.8 | 50.4 | 20.38 | 3.473 | |
| 4,800.0 | 4,796.5 | 4,782.3 | 4,773.3 | 10.6 | 10.6 | 1.89 | -42.8 | 108.5 | 77.6 | 57.1 | 20.51 | 3.786 | |
| 4,900.0 | 4,892.6 | 4,878.2 | 4,864.0 | 10.9 | 10.9 | 0.24 | -51.4 | 138.3 | 82.6 | 62.0 | 20.56 | 4.018 | |
| 5,000.0 | 4,986.6 | 4,973.9 | 4,952.9 | 11.2 | 11.3 | -1.45 | -61.4 | 172.4 | 85.6 | 65.1 | 20.53 | 4.171 | |
| 5,100.0 | 5,077.9 | 5,069.5 | 5,039.8 | 11.5 | 11.8 | -3.30 | -72.5 | 210.7 | 86.8 | 66.4 | 20.45 | 4.245 | |

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

| | | | |
|---|---|---|---|
| **Company:** | Great Western | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Project:** | SEC.34-T7N-R64W | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Reference Site:** | Bruegman South Pad Sec.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (11-1-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Bruegman South Pad Sec.34-T7N-R64W - Bruegman South EG 34-027HC - Wellbore #1 - Plan #1 (11- | **Offset Site Error:** 0.0 ft | **Offset Well Error:** 0.0 ft

**Survey Program:** 0-MWD

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,200.0 | 5,166.2 | 5,165.1 | 5,124.5 | 12.0 | 12.3 | -5.42 | -84.8 | 253.1 | 86.1 | 65.8 | 20.33 | 4.237 | |
| 5,243.0 | 5,203.4 | 5,206.2 | 5,160.3 | 12.3 | 12.5 | -6.41 | -90.5 | 272.6 | 85.8 | 65.3 | 20.51 | 4.186 | |
| 5,300.0 | 5,252.5 | 5,262.6 | 5,208.8 | 12.6 | 12.9 | -7.76 | -98.5 | 300.1 | 86.0 | 65.2 | 20.76 | 4.141 | |
| 5,400.0 | 5,338.7 | 5,362.5 | 5,294.9 | 13.3 | 13.6 | -10.10 | -112.6 | 348.9 | 86.8 | 65.5 | 21.33 | 4.069 | |
| 5,500.0 | 5,425.0 | 5,462.4 | 5,380.9 | 14.0 | 14.4 | -12.39 | -126.8 | 397.8 | 87.7 | 65.8 | 21.97 | 3.994 | |
| 5,600.0 | 5,511.3 | 5,562.4 | 5,466.9 | 14.8 | 15.2 | -14.63 | -141.0 | 446.6 | 88.8 | 66.1 | 22.69 | 3.915 | |
| 5,700.0 | 5,597.5 | 5,662.3 | 5,552.9 | 15.6 | 16.1 | -16.81 | -155.2 | 495.5 | 90.1 | 66.5 | 23.50 | 3.832 | |
| 5,800.0 | 5,683.8 | 5,762.2 | 5,639.0 | 16.4 | 17.0 | -18.93 | -169.4 | 544.3 | 91.4 | 67.0 | 24.42 | 3.743 | |
| 5,900.0 | 5,770.1 | 5,862.2 | 5,725.0 | 17.3 | 17.9 | -20.99 | -183.6 | 593.1 | 92.9 | 67.4 | 25.44 | 3.651 | |
| 6,000.0 | 5,856.3 | 5,962.1 | 5,811.0 | 18.2 | 18.9 | -22.98 | -197.8 | 642.0 | 94.4 | 67.9 | 26.56 | 3.555 | |
| 6,100.0 | 5,942.6 | 6,062.0 | 5,897.1 | 19.2 | 19.8 | -24.90 | -212.0 | 690.8 | 96.1 | 68.3 | 27.80 | 3.458 | |
| 6,200.0 | 6,028.9 | 6,162.0 | 5,983.1 | 20.1 | 20.8 | -26.76 | -226.1 | 739.6 | 97.9 | 68.8 | 29.14 | 3.360 | |
| 6,300.0 | 6,115.1 | 6,261.9 | 6,069.1 | 21.1 | 21.8 | -28.54 | -240.3 | 788.5 | 99.8 | 69.2 | 30.59 | 3.264 | |
| 6,400.0 | 6,201.4 | 6,361.8 | 6,155.1 | 22.1 | 22.9 | -30.26 | -254.5 | 837.3 | 101.8 | 69.7 | 32.13 | 3.169 | |
| 6,500.0 | 6,287.7 | 6,461.8 | 6,241.2 | 23.1 | 23.9 | -31.91 | -268.7 | 886.2 | 103.9 | 70.1 | 33.76 | 3.078 | |
| 6,600.0 | 6,373.9 | 6,561.7 | 6,327.2 | 24.1 | 24.9 | -33.50 | -282.9 | 935.0 | 106.1 | 70.6 | 35.47 | 2.990 | |
| 6,700.0 | 6,460.2 | 6,661.6 | 6,413.2 | 25.2 | 26.0 | -35.02 | -297.1 | 983.8 | 108.3 | 71.0 | 37.26 | 2.906 | |
| 6,800.0 | 6,546.8 | 6,761.6 | 6,499.2 | 26.1 | 27.0 | -23.55 | -311.3 | 1,032.7 | 109.7 | 71.4 | 38.27 | 2.866 | |
| 6,900.0 | 6,634.2 | 6,859.4 | 6,583.5 | 26.9 | 28.1 | 9.87 | -325.2 | 1,080.5 | 107.0 | 72.1 | 34.88 | 3.066 | |
| 6,927.0 | 6,657.4 | 6,884.9 | 6,605.4 | 27.1 | 28.4 | 20.06 | -328.8 | 1,092.9 | 106.6 | 73.0 | 33.64 | 3.169 | |
| 7,000.0 | 6,718.3 | 6,950.4 | 6,661.8 | 27.6 | 29.1 | 47.16 | -338.1 | 1,124.9 | 111.1 | 79.1 | 31.93 | 3.479 | |
| 7,100.0 | 6,794.9 | 7,046.7 | 6,745.3 | 28.1 | 30.0 | 78.49 | -342.7 | 1,172.3 | 135.6 | 102.0 | 33.57 | 4.039 | |
| 7,200.0 | 6,860.0 | 7,159.6 | 6,841.6 | 28.4 | 30.8 | 99.61 | -321.6 | 1,226.8 | 172.7 | 138.8 | 33.89 | 5.095 | |
| 7,300.0 | 6,910.2 | 7,296.9 | 6,947.6 | 28.6 | 31.6 | 113.24 | -259.4 | 1,286.7 | 211.9 | 180.7 | 31.27 | 6.776 | |
| 7,400.0 | 6,943.1 | 7,467.7 | 7,048.3 | 28.7 | 32.2 | 121.47 | -135.1 | 1,343.3 | 244.0 | 216.4 | 27.68 | 8.816 | |
| 7,500.0 | 6,956.9 | 7,671.1 | 7,104.5 | 28.7 | 32.5 | 124.86 | 55.9 | 1,374.5 | 259.7 | 233.4 | 26.20 | 9.910 | |
| 7,600.0 | 6,957.3 | 7,793.6 | 7,106.3 | 28.7 | 32.4 | 124.93 | 178.3 | 1,375.0 | 260.2 | 233.4 | 26.81 | 9.706 | |
| 7,700.0 | 6,957.3 | 7,893.6 | 7,106.3 | 28.7 | 32.5 | 124.91 | 278.3 | 1,374.6 | 260.4 | 232.7 | 27.69 | 9.403 | |
| 7,800.0 | 6,957.3 | 7,993.6 | 7,106.3 | 28.8 | 32.6 | 124.89 | 378.3 | 1,374.2 | 260.5 | 231.6 | 28.91 | 9.010 | |
| 7,900.0 | 6,957.3 | 8,093.6 | 7,106.3 | 29.0 | 32.8 | 124.87 | 478.3 | 1,373.8 | 260.6 | 230.2 | 30.44 | 8.562 | |
| 8,000.0 | 6,957.3 | 8,193.6 | 7,106.3 | 29.3 | 33.1 | 124.85 | 578.3 | 1,373.4 | 260.8 | 228.5 | 32.23 | 8.091 | |
| 8,100.0 | 6,957.3 | 8,293.6 | 7,106.3 | 29.8 | 33.4 | 124.83 | 678.3 | 1,373.0 | 260.9 | 226.7 | 34.23 | 7.621 | |
| 8,200.0 | 6,957.3 | 8,393.6 | 7,106.3 | 30.3 | 33.9 | 124.81 | 778.3 | 1,372.6 | 261.0 | 224.6 | 36.43 | 7.166 | |
| 8,300.0 | 6,957.3 | 8,493.6 | 7,106.3 | 31.0 | 34.4 | 124.79 | 878.3 | 1,372.2 | 261.2 | 222.4 | 38.77 | 6.735 | |
| 8,400.0 | 6,957.3 | 8,593.6 | 7,106.3 | 31.9 | 35.1 | 124.77 | 978.3 | 1,371.8 | 261.3 | 220.0 | 41.25 | 6.335 | |
| 8,500.0 | 6,957.3 | 8,693.6 | 7,106.3 | 32.8 | 35.9 | 124.75 | 1,078.3 | 1,371.4 | 261.4 | 217.6 | 43.83 | 5.965 | |
| 8,600.0 | 6,957.3 | 8,793.6 | 7,106.3 | 33.9 | 36.8 | 124.73 | 1,178.3 | 1,371.1 | 261.5 | 215.1 | 46.49 | 5.625 | |
| 8,700.0 | 6,957.3 | 8,893.6 | 7,106.3 | 35.1 | 37.8 | 124.71 | 1,278.3 | 1,370.7 | 261.7 | 212.4 | 49.24 | 5.315 | |
| 8,800.0 | 6,957.3 | 8,993.6 | 7,106.3 | 36.4 | 39.0 | 124.69 | 1,378.3 | 1,370.3 | 261.8 | 209.8 | 52.04 | 5.030 | |
| 8,900.0 | 6,957.3 | 9,093.6 | 7,106.3 | 37.8 | 40.2 | 124.67 | 1,478.3 | 1,369.9 | 261.9 | 207.0 | 54.90 | 4.771 | |
| 9,000.0 | 6,957.3 | 9,193.6 | 7,106.3 | 39.2 | 41.5 | 124.65 | 1,578.3 | 1,369.5 | 262.1 | 204.3 | 57.81 | 4.533 | |
| 9,100.0 | 6,957.3 | 9,293.6 | 7,106.3 | 40.7 | 42.8 | 124.63 | 1,678.3 | 1,369.1 | 262.2 | 201.4 | 60.76 | 4.316 | |
| 9,200.0 | 6,957.3 | 9,393.6 | 7,106.3 | 42.2 | 44.2 | 124.61 | 1,778.3 | 1,368.7 | 262.3 | 198.6 | 63.74 | 4.116 | |
| 9,300.0 | 6,957.3 | 9,493.6 | 7,106.3 | 43.8 | 45.7 | 124.59 | 1,878.3 | 1,368.3 | 262.5 | 195.7 | 66.75 | 3.932 | |
| 9,400.0 | 6,957.3 | 9,593.6 | 7,106.3 | 45.4 | 47.2 | 124.57 | 1,978.3 | 1,367.9 | 262.6 | 192.8 | 69.78 | 3.763 | |
| 9,500.0 | 6,957.3 | 9,693.6 | 7,106.3 | 47.1 | 48.8 | 124.55 | 2,078.3 | 1,367.5 | 262.7 | 189.9 | 72.84 | 3.607 | |
| 9,600.0 | 6,957.3 | 9,793.6 | 7,106.3 | 48.7 | 50.4 | 124.53 | 2,178.3 | 1,367.1 | 262.9 | 186.9 | 75.92 | 3.462 | |
| 9,700.0 | 6,957.3 | 9,893.6 | 7,106.3 | 50.4 | 52.0 | 124.51 | 2,278.3 | 1,366.7 | 263.0 | 184.0 | 79.02 | 3.328 | |
| 9,800.0 | 6,957.3 | 9,993.6 | 7,106.3 | 52.1 | 53.6 | 124.49 | 2,378.3 | 1,366.3 | 263.1 | 181.0 | 82.13 | 3.204 | |
| 9,900.0 | 6,957.3 | 10,093.6 | 7,106.3 | 53.8 | 55.3 | 124.47 | 2,478.3 | 1,365.9 | 263.2 | 178.0 | 85.26 | 3.088 | |
| 10,000.0 | 6,957.3 | 10,193.6 | 7,106.3 | 55.5 | 57.0 | 124.45 | 2,578.3 | 1,365.5 | 263.4 | 175.0 | 88.40 | 2.979 | |
| 10,100.0 | 6,957.3 | 10,293.6 | 7,106.3 | 57.3 | 58.7 | 124.43 | 2,678.3 | 1,365.1 | 263.5 | 172.0 | 91.55 | 2.878 | |

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

| | | | |
|---|---|---|---|
| **Company:** | Great Western | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Project:** | SEC.34-T7N-R64W | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Reference Site:** | Bruegman South Pad Sec.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (11-1-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Bruegman South Pad Sec.34-T7N-R64W - Bruegman South EG 34-027HC - Wellbore #1 - Plan #1 (11- **Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD **Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10,200.0 | 6,957.3 | 10,393.6 | 7,106.3 | 59.0 | 60.4 | 124.41 | 2,778.3 | 1,364.7 | 263.6 | 168.9 | 94.72 | 2.783 | |
| 10,300.0 | 6,957.3 | 10,493.6 | 7,106.3 | 60.8 | 62.1 | 124.39 | 2,878.3 | 1,364.3 | 263.8 | 165.9 | 97.89 | 2.695 | |
| 10,400.0 | 6,957.3 | 10,593.6 | 7,106.3 | 62.6 | 63.8 | 124.37 | 2,978.3 | 1,363.9 | 263.9 | 162.8 | 101.07 | 2.611 | |
| 10,500.0 | 6,957.3 | 10,693.6 | 7,106.3 | 64.4 | 65.6 | 124.36 | 3,078.3 | 1,363.5 | 264.0 | 159.8 | 104.27 | 2.532 | |
| 10,600.0 | 6,957.3 | 10,793.6 | 7,106.3 | 66.2 | 67.4 | 124.34 | 3,178.3 | 1,363.1 | 264.2 | 156.7 | 107.46 | 2.458 | |
| 10,700.0 | 6,957.3 | 10,893.6 | 7,106.3 | 68.0 | 69.1 | 124.32 | 3,278.3 | 1,362.8 | 264.3 | 153.6 | 110.67 | 2.388 | |
| 10,800.0 | 6,957.3 | 10,993.6 | 7,106.3 | 69.8 | 70.9 | 124.30 | 3,378.3 | 1,362.4 | 264.4 | 150.5 | 113.88 | 2.322 | |
| 10,900.0 | 6,957.3 | 11,093.6 | 7,106.3 | 71.6 | 72.7 | 124.28 | 3,478.3 | 1,362.0 | 264.6 | 147.5 | 117.10 | 2.259 | |
| 11,000.0 | 6,957.3 | 11,193.6 | 7,106.3 | 73.4 | 74.5 | 124.26 | 3,578.3 | 1,361.6 | 264.7 | 144.4 | 120.33 | 2.200 | |
| 11,100.0 | 6,957.3 | 11,293.6 | 7,106.3 | 75.3 | 76.3 | 124.24 | 3,678.3 | 1,361.2 | 264.8 | 141.3 | 123.56 | 2.143 | |
| 11,200.0 | 6,957.3 | 11,393.6 | 7,106.3 | 77.1 | 78.1 | 124.22 | 3,778.3 | 1,360.8 | 265.0 | 138.2 | 126.80 | 2.090 | |
| 11,300.0 | 6,957.3 | 11,493.6 | 7,106.3 | 78.9 | 79.9 | 124.20 | 3,878.3 | 1,360.4 | 265.1 | 135.0 | 130.04 | 2.039 | |
| 11,400.0 | 6,957.3 | 11,593.6 | 7,106.3 | 80.8 | 81.8 | 124.18 | 3,978.3 | 1,360.0 | 265.2 | 131.9 | 133.28 | 1.990 | |
| 11,500.0 | 6,957.3 | 11,693.6 | 7,106.3 | 82.6 | 83.6 | 124.16 | 4,078.3 | 1,359.6 | 265.3 | 128.8 | 136.53 | 1.943 | |
| 11,600.0 | 6,957.3 | 11,793.6 | 7,106.3 | 84.5 | 85.4 | 124.14 | 4,178.3 | 1,359.2 | 265.5 | 125.7 | 139.79 | 1.899 | |
| 11,700.0 | 6,957.3 | 11,893.6 | 7,106.3 | 86.3 | 87.2 | 124.12 | 4,278.3 | 1,358.8 | 265.6 | 122.6 | 143.04 | 1.857 | |
| 11,800.0 | 6,957.3 | 11,993.6 | 7,106.3 | 88.2 | 89.1 | 124.10 | 4,378.3 | 1,358.4 | 265.7 | 119.4 | 146.31 | 1.816 | |
| 11,869.5 | 6,957.3 | 12,063.1 | 7,106.3 | 89.5 | 90.4 | 124.09 | 4,447.8 | 1,358.1 | 265.8 | 117.3 | 148.57 | 1.789 | |

| | | | |
|---|---|---|---|
| **Company:** | Great Western | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Project:** | SEC.34-T7N-R64W | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Reference Site:** | Bruegman South Pad Sec.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (11-1-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Bruegman South Pad Sec.34-T7N-R64W - Bruegman South EG 34-029HN - Wellbore #1 - Plan #1 (11- | **Offset Site Error:** 0.0 ft | **Offset Well Error:** 0.0 ft

**Survey Program:** 0-MWD

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 127.30 | -36.4 | 47.8 | 60.1 | | | | |
| 100.0 | 100.0 | 100.0 | 100.0 | 0.1 | 0.1 | 127.30 | -36.4 | 47.8 | 60.1 | 59.9 | 0.22 | 267.458 | |
| 200.0 | 200.0 | 200.0 | 200.0 | 0.3 | 0.3 | 127.30 | -36.4 | 47.8 | 60.1 | 59.4 | 0.67 | 89.153 | |
| 300.0 | 300.0 | 300.0 | 300.0 | 0.6 | 0.6 | 127.30 | -36.4 | 47.8 | 60.1 | 59.0 | 1.12 | 53.492 | |
| 400.0 | 400.0 | 400.0 | 400.0 | 0.8 | 0.8 | 127.30 | -36.4 | 47.8 | 60.1 | 58.5 | 1.57 | 38.208 | |
| 500.0 | 500.0 | 500.0 | 500.0 | 1.0 | 1.0 | 127.30 | -36.4 | 47.8 | 60.1 | 58.1 | 2.02 | 29.718 | |
| 600.0 | 600.0 | 600.0 | 600.0 | 1.2 | 1.2 | 127.30 | -36.4 | 47.8 | 60.1 | 57.6 | 2.47 | 24.314 | |
| 700.0 | 700.0 | 700.0 | 700.0 | 1.5 | 1.5 | 127.30 | -36.4 | 47.8 | 60.1 | 57.2 | 2.92 | 20.574 | |
| 800.0 | 800.0 | 800.0 | 800.0 | 1.7 | 1.7 | 127.30 | -36.4 | 47.8 | 60.1 | 56.7 | 3.37 | 17.831 | |
| 900.0 | 900.0 | 900.0 | 900.0 | 1.9 | 1.9 | 127.30 | -36.4 | 47.8 | 60.1 | 56.3 | 3.82 | 15.733 | |
| 1,000.0 | 1,000.0 | 1,000.0 | 1,000.0 | 2.1 | 2.1 | 127.30 | -36.4 | 47.8 | 60.1 | 55.8 | 4.27 | 14.077 | |
| 1,100.0 | 1,100.0 | 1,100.0 | 1,100.0 | 2.4 | 2.4 | 127.30 | -36.4 | 47.8 | 60.1 | 55.4 | 4.72 | 12.736 | |
| 1,200.0 | 1,200.0 | 1,200.0 | 1,200.0 | 2.6 | 2.6 | 127.30 | -36.4 | 47.8 | 60.1 | 54.9 | 5.17 | 11.629 | |
| 1,300.0 | 1,300.0 | 1,300.0 | 1,300.0 | 2.8 | 2.8 | 127.30 | -36.4 | 47.8 | 60.1 | 54.5 | 5.62 | 10.698 | |
| 1,400.0 | 1,400.0 | 1,400.0 | 1,400.0 | 3.0 | 3.0 | 127.30 | -36.4 | 47.8 | 60.1 | 54.0 | 6.07 | 9.906 | |
| 1,500.0 | 1,500.0 | 1,500.0 | 1,500.0 | 3.3 | 3.3 | 127.30 | -36.4 | 47.8 | 60.1 | 53.6 | 6.52 | 9.223 | |
| 1,600.0 | 1,600.0 | 1,600.0 | 1,600.0 | 3.5 | 3.5 | 127.30 | -36.4 | 47.8 | 60.1 | 53.1 | 6.97 | 8.628 | |
| 1,700.0 | 1,700.0 | 1,700.0 | 1,700.0 | 3.7 | 3.7 | 127.30 | -36.4 | 47.8 | 60.1 | 52.7 | 7.42 | 8.105 | |
| 1,800.0 | 1,800.0 | 1,800.0 | 1,800.0 | 3.9 | 3.9 | 127.30 | -36.4 | 47.8 | 60.1 | 52.2 | 7.87 | 7.642 | |
| 1,900.0 | 1,900.0 | 1,900.0 | 1,900.0 | 4.2 | 4.2 | 127.30 | -36.4 | 47.8 | 60.1 | 51.8 | 8.32 | 7.229 | |
| 2,000.0 | 2,000.0 | 2,000.0 | 2,000.0 | 4.4 | 4.4 | 127.30 | -36.4 | 47.8 | 60.1 | 51.3 | 8.77 | 6.858 | |
| 2,100.0 | 2,100.0 | 2,100.0 | 2,100.0 | 4.6 | 4.6 | 127.30 | -36.4 | 47.8 | 60.1 | 50.9 | 9.22 | 6.523 | |
| 2,200.0 | 2,200.0 | 2,200.0 | 2,200.0 | 4.8 | 4.8 | 127.30 | -36.4 | 47.8 | 60.1 | 50.5 | 9.66 | 6.220 | |
| 2,300.0 | 2,300.0 | 2,300.0 | 2,300.0 | 5.1 | 5.1 | 127.30 | -36.4 | 47.8 | 60.1 | 50.0 | 10.11 | 5.944 | |
| 2,400.0 | 2,400.0 | 2,400.0 | 2,400.0 | 5.3 | 5.3 | 127.30 | -36.4 | 47.8 | 60.1 | 49.6 | 10.56 | 5.691 | |
| 2,500.0 | 2,500.0 | 2,500.0 | 2,500.0 | 5.5 | 5.5 | 127.30 | -36.4 | 47.8 | 60.1 | 49.1 | 11.01 | 5.458 | |
| 2,600.0 | 2,600.0 | 2,600.0 | 2,600.0 | 5.7 | 5.7 | 127.30 | -36.4 | 47.8 | 60.1 | 48.7 | 11.46 | 5.244 | |
| 2,700.0 | 2,700.0 | 2,700.0 | 2,700.0 | 6.0 | 6.0 | 127.30 | -36.4 | 47.8 | 60.1 | 48.2 | 11.91 | 5.046 | |
| 2,800.0 | 2,800.0 | 2,800.0 | 2,800.0 | 6.2 | 6.2 | 127.30 | -36.4 | 47.8 | 60.1 | 47.8 | 12.36 | 4.863 | |
| 2,900.0 | 2,900.0 | 2,900.0 | 2,900.0 | 6.4 | 6.4 | 127.30 | -36.4 | 47.8 | 60.1 | 47.3 | 12.81 | 4.692 | |
| 3,000.0 | 3,000.0 | 3,000.0 | 3,000.0 | 6.6 | 6.6 | 127.30 | -36.4 | 47.8 | 60.1 | 46.9 | 13.26 | 4.533 | |
| 3,100.0 | 3,100.0 | 3,100.0 | 3,100.0 | 6.9 | 6.9 | 127.30 | -36.4 | 47.8 | 60.1 | 46.4 | 13.71 | 4.385 | |
| 3,200.0 | 3,200.0 | 3,200.0 | 3,200.0 | 7.1 | 7.1 | 127.30 | -36.4 | 47.8 | 60.1 | 46.0 | 14.16 | 4.245 | |
| 3,300.0 | 3,300.0 | 3,300.0 | 3,300.0 | 7.3 | 7.3 | 127.30 | -36.4 | 47.8 | 60.1 | 45.5 | 14.61 | 4.115 | |
| 3,400.0 | 3,400.0 | 3,400.0 | 3,400.0 | 7.5 | 7.5 | 127.30 | -36.4 | 47.8 | 60.1 | 45.1 | 15.06 | 3.992 | |
| 3,500.0 | 3,500.0 | 3,500.0 | 3,500.0 | 7.8 | 7.8 | 127.30 | -36.4 | 47.8 | 60.1 | 44.6 | 15.51 | 3.876 | CC, ES |
| 3,600.0 | 3,600.0 | 3,597.2 | 3,597.1 | 8.0 | 8.0 | 126.33 | -36.9 | 50.2 | 62.4 | 46.5 | 15.94 | 3.917 | |
| 3,700.0 | 3,700.0 | 3,693.8 | 3,693.5 | 8.2 | 8.1 | 123.81 | -38.5 | 57.4 | 69.4 | 53.1 | 16.35 | 4.246 | |
| 3,800.0 | 3,800.0 | 3,789.5 | 3,788.4 | 8.4 | 8.3 | 120.60 | -40.9 | 69.2 | 81.3 | 64.5 | 16.78 | 4.845 | |
| 3,900.0 | 3,900.0 | 3,883.7 | 3,881.1 | 8.7 | 8.6 | 117.45 | -44.4 | 85.4 | 98.1 | 80.9 | 17.21 | 5.697 | |
| 4,000.0 | 4,000.0 | 3,976.1 | 3,971.1 | 8.9 | 8.8 | 114.72 | -48.6 | 105.6 | 119.8 | 102.1 | 17.67 | 6.778 | |
| 4,100.0 | 4,100.0 | 4,066.2 | 4,058.0 | 9.1 | 9.1 | 112.52 | -53.6 | 129.3 | 146.2 | 128.0 | 18.15 | 8.055 | |
| 4,200.0 | 4,200.0 | 4,153.8 | 4,141.1 | 9.3 | 9.3 | 110.78 | -59.3 | 156.3 | 177.2 | 158.5 | 18.66 | 9.495 | |
| 4,300.0 | 4,300.0 | 4,238.7 | 4,220.4 | 9.6 | 9.7 | 109.42 | -65.5 | 185.9 | 212.5 | 193.3 | 19.21 | 11.065 | |
| 4,400.0 | 4,400.0 | 4,320.6 | 4,295.6 | 9.8 | 10.0 | 108.36 | -72.2 | 217.7 | 252.0 | 232.2 | 19.79 | 12.733 | |
| 4,500.0 | 4,500.0 | 4,400.0 | 4,367.1 | 10.0 | 10.5 | -2.71 | -79.4 | 251.5 | 294.6 | 275.0 | 19.57 | 15.050 | |
| 4,600.0 | 4,599.7 | 4,478.0 | 4,435.8 | 10.2 | 11.0 | -3.35 | -87.0 | 287.5 | 335.4 | 315.5 | 19.87 | 16.880 | |
| 4,700.0 | 4,698.7 | 4,564.7 | 4,510.8 | 10.4 | 11.6 | -3.99 | -96.0 | 330.1 | 372.9 | 352.8 | 20.11 | 18.541 | |
| 4,800.0 | 4,796.5 | 4,659.5 | 4,592.7 | 10.6 | 12.3 | -4.63 | -105.8 | 377.0 | 404.3 | 384.0 | 20.31 | 19.909 | |
| 4,900.0 | 4,892.6 | 4,756.3 | 4,676.1 | 10.9 | 13.1 | -5.26 | -115.9 | 424.7 | 429.1 | 408.7 | 20.45 | 20.981 | |
| 5,000.0 | 4,986.6 | 4,854.4 | 4,760.9 | 11.2 | 13.9 | -5.92 | -126.1 | 473.2 | 447.2 | 426.6 | 20.55 | 21.765 | |
| 5,100.0 | 5,077.9 | 4,953.6 | 4,846.5 | 11.5 | 14.8 | -6.65 | -136.5 | 522.2 | 458.5 | 437.9 | 20.59 | 22.262 | |

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

| | | | |
|---|---|---|---|
| **Company:** | Great Western | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Project:** | SEC.34-T7N-R64W | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Reference Site:** | Bruegman South Pad Sec.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (11-1-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Bruegman South Pad Sec.34-T7N-R64W - Bruegman South EG 34-029HN - Wellbore #1 - Plan #1 (11- | **Offset Site Error:** 0.0 ft

**Survey Program:** 0-MWD | **Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5,200.0 | 5,166.2 | 5,053.2 | 4,932.5 | 12.0 | 15.8 | -7.47 | -146.8 | 571.4 | 462.9 | 442.3 | 20.61 | 22.465 | |
| 5,300.0 | 5,252.5 | 5,153.0 | 5,018.6 | 12.6 | 16.7 | -8.38 | -157.2 | 620.7 | 463.4 | 442.3 | 21.11 | 21.951 | |
| 5,400.0 | 5,338.7 | 5,252.7 | 5,104.7 | 13.3 | 17.7 | -9.28 | -167.6 | 670.0 | 464.0 | 442.3 | 21.70 | 21.379 | |
| 5,500.0 | 5,425.0 | 5,352.4 | 5,190.8 | 14.0 | 18.7 | -10.19 | -178.0 | 719.2 | 464.6 | 442.3 | 22.33 | 20.811 | |
| 5,600.0 | 5,511.3 | 5,452.1 | 5,276.8 | 14.8 | 19.7 | -11.09 | -188.4 | 768.5 | 465.4 | 442.4 | 22.99 | 20.246 | |
| 5,700.0 | 5,597.5 | 5,551.9 | 5,362.9 | 15.6 | 20.7 | -11.98 | -198.8 | 817.8 | 466.3 | 442.6 | 23.69 | 19.685 | |
| 5,800.0 | 5,683.8 | 5,651.6 | 5,449.0 | 16.4 | 21.8 | -12.88 | -209.2 | 867.0 | 467.4 | 442.9 | 24.43 | 19.129 | |
| 5,900.0 | 5,770.1 | 5,751.3 | 5,535.1 | 17.3 | 22.8 | -13.76 | -219.6 | 916.3 | 468.5 | 443.3 | 25.22 | 18.579 | |
| 6,000.0 | 5,856.3 | 5,851.1 | 5,621.2 | 18.2 | 23.9 | -14.65 | -229.9 | 965.6 | 469.7 | 443.7 | 26.04 | 18.036 | |
| 6,100.0 | 5,942.6 | 5,950.8 | 5,707.3 | 19.2 | 24.9 | -15.53 | -240.3 | 1,014.8 | 471.1 | 444.2 | 26.92 | 17.501 | |
| 6,200.0 | 6,028.9 | 6,050.5 | 5,793.4 | 20.1 | 26.0 | -16.40 | -250.7 | 1,064.1 | 472.6 | 444.7 | 27.84 | 16.974 | |
| 6,300.0 | 6,115.1 | 6,150.2 | 5,879.5 | 21.1 | 27.1 | -17.27 | -261.1 | 1,113.4 | 474.2 | 445.4 | 28.81 | 16.458 | |
| 6,400.0 | 6,201.4 | 6,250.0 | 5,965.5 | 22.1 | 28.2 | -18.13 | -271.5 | 1,162.6 | 475.9 | 446.0 | 29.83 | 15.952 | |
| 6,500.0 | 6,287.7 | 6,349.7 | 6,051.6 | 23.1 | 29.2 | -18.99 | -281.9 | 1,211.9 | 477.7 | 446.8 | 30.90 | 15.458 | |
| 6,600.0 | 6,373.9 | 6,449.4 | 6,137.7 | 24.1 | 30.3 | -19.84 | -292.3 | 1,261.1 | 479.6 | 447.5 | 32.02 | 14.977 | |
| 6,700.0 | 6,460.2 | 6,549.2 | 6,223.8 | 25.2 | 31.4 | -20.68 | -302.7 | 1,310.4 | 481.6 | 448.4 | 33.19 | 14.510 | |
| 6,800.0 | 6,546.8 | 6,649.0 | 6,310.0 | 26.1 | 32.5 | -9.80 | -313.1 | 1,359.7 | 483.5 | 449.3 | 34.25 | 14.117 | |
| 6,900.0 | 6,634.2 | 6,747.5 | 6,395.0 | 26.9 | 33.6 | 14.99 | -323.3 | 1,408.4 | 484.6 | 450.2 | 34.32 | 14.117 | |
| 7,000.0 | 6,718.3 | 6,840.0 | 6,474.8 | 27.6 | 34.6 | 36.97 | -332.9 | 1,454.1 | 486.7 | 452.7 | 33.94 | 14.340 | |
| 7,100.0 | 6,794.9 | 6,924.6 | 6,547.9 | 28.1 | 35.6 | 53.37 | -341.5 | 1,495.9 | 494.4 | 460.4 | 33.92 | 14.573 | |
| 7,200.0 | 6,860.0 | 7,028.7 | 6,638.0 | 28.4 | 36.5 | 66.02 | -336.3 | 1,547.4 | 510.0 | 475.6 | 34.37 | 14.838 | |
| 7,300.0 | 6,910.2 | 7,161.7 | 6,747.2 | 28.6 | 37.5 | 76.19 | -294.7 | 1,609.7 | 531.3 | 496.4 | 34.94 | 15.209 | |
| 7,400.0 | 6,943.1 | 7,345.1 | 6,870.5 | 28.7 | 38.4 | 84.82 | -180.5 | 1,679.7 | 553.2 | 517.9 | 35.24 | 15.697 | |
| 7,500.0 | 6,956.9 | 7,594.7 | 6,954.5 | 28.7 | 38.9 | 89.85 | 46.2 | 1,726.8 | 565.6 | 529.8 | 35.84 | 15.781 | |
| 7,600.0 | 6,957.3 | 7,728.5 | 6,957.3 | 28.7 | 38.9 | 90.00 | 179.9 | 1,727.8 | 566.1 | 529.4 | 36.73 | 15.412 | |
| 7,700.0 | 6,957.3 | 7,828.5 | 6,957.3 | 28.7 | 39.0 | 90.00 | 279.9 | 1,727.3 | 566.3 | 528.4 | 37.84 | 14.966 | |
| 7,800.0 | 6,957.3 | 7,928.5 | 6,957.3 | 28.8 | 39.1 | 90.00 | 379.9 | 1,726.9 | 566.4 | 527.1 | 39.29 | 14.417 | |
| 7,900.0 | 6,957.3 | 8,028.5 | 6,957.3 | 29.0 | 39.2 | 90.00 | 479.9 | 1,726.5 | 566.5 | 525.5 | 41.05 | 13.801 | |
| 8,000.0 | 6,957.3 | 8,128.5 | 6,957.3 | 29.3 | 39.4 | 90.00 | 579.9 | 1,726.1 | 566.6 | 523.6 | 43.08 | 13.152 | |
| 8,100.0 | 6,957.3 | 8,228.5 | 6,957.3 | 29.8 | 39.7 | 90.00 | 679.9 | 1,725.6 | 566.8 | 521.4 | 45.36 | 12.496 | |
| 8,200.0 | 6,957.3 | 8,328.5 | 6,957.3 | 30.3 | 40.0 | 90.00 | 779.9 | 1,725.2 | 566.9 | 519.1 | 47.83 | 11.852 | |
| 8,300.0 | 6,957.3 | 8,428.5 | 6,957.3 | 31.0 | 40.5 | 90.00 | 879.9 | 1,724.8 | 567.0 | 516.5 | 50.48 | 11.233 | |
| 8,400.0 | 6,957.3 | 8,528.5 | 6,957.3 | 31.9 | 41.0 | 90.00 | 979.9 | 1,724.3 | 567.1 | 513.9 | 53.27 | 10.646 | |
| 8,500.0 | 6,957.3 | 8,628.5 | 6,957.3 | 32.8 | 41.6 | 90.00 | 1,079.9 | 1,723.9 | 567.3 | 511.1 | 56.19 | 10.096 | |
| 8,600.0 | 6,957.3 | 8,728.5 | 6,957.3 | 33.9 | 42.2 | 90.00 | 1,179.9 | 1,723.5 | 567.4 | 508.2 | 59.22 | 9.582 | |
| 8,700.0 | 6,957.3 | 8,828.5 | 6,957.3 | 35.1 | 43.0 | 90.00 | 1,279.9 | 1,723.1 | 567.5 | 505.2 | 62.33 | 9.105 | |
| 8,800.0 | 6,957.3 | 8,928.5 | 6,957.3 | 36.4 | 43.9 | 90.00 | 1,379.9 | 1,722.6 | 567.6 | 502.1 | 65.53 | 8.663 | |
| 8,900.0 | 6,957.3 | 9,028.5 | 6,957.3 | 37.8 | 44.8 | 90.00 | 1,479.9 | 1,722.2 | 567.8 | 499.0 | 68.79 | 8.254 | |
| 9,000.0 | 6,957.3 | 9,128.5 | 6,957.3 | 39.2 | 45.9 | 90.00 | 1,579.9 | 1,721.8 | 567.9 | 495.8 | 72.11 | 7.876 | |
| 9,100.0 | 6,957.3 | 9,228.5 | 6,957.3 | 40.7 | 47.0 | 90.00 | 1,679.9 | 1,721.3 | 568.0 | 492.5 | 75.48 | 7.526 | |
| 9,200.0 | 6,957.3 | 9,328.5 | 6,957.3 | 42.2 | 48.2 | 90.00 | 1,779.9 | 1,720.9 | 568.1 | 489.3 | 78.89 | 7.202 | |
| 9,300.0 | 6,957.3 | 9,428.5 | 6,957.3 | 43.8 | 49.4 | 90.00 | 1,879.9 | 1,720.5 | 568.3 | 485.9 | 82.34 | 6.901 | |
| 9,400.0 | 6,957.3 | 9,528.5 | 6,957.3 | 45.4 | 50.8 | 90.00 | 1,979.9 | 1,720.1 | 568.4 | 482.6 | 85.83 | 6.622 | |
| 9,500.0 | 6,957.3 | 9,628.5 | 6,957.3 | 47.1 | 52.1 | 90.00 | 2,079.9 | 1,719.6 | 568.5 | 479.2 | 89.35 | 6.363 | |
| 9,600.0 | 6,957.3 | 9,728.5 | 6,957.3 | 48.7 | 53.6 | 90.00 | 2,179.9 | 1,719.2 | 568.7 | 475.8 | 92.89 | 6.122 | |
| 9,700.0 | 6,957.3 | 9,828.5 | 6,957.3 | 50.4 | 55.0 | 90.00 | 2,279.9 | 1,718.8 | 568.8 | 472.3 | 96.46 | 5.897 | |
| 9,800.0 | 6,957.3 | 9,928.5 | 6,957.3 | 52.1 | 56.5 | 90.00 | 2,379.9 | 1,718.3 | 568.9 | 468.9 | 100.04 | 5.687 | |
| 9,900.0 | 6,957.3 | 10,028.5 | 6,957.3 | 53.8 | 58.1 | 90.00 | 2,479.9 | 1,717.9 | 569.0 | 465.4 | 103.65 | 5.490 | |
| 10,000.0 | 6,957.3 | 10,128.5 | 6,957.3 | 55.5 | 59.6 | 90.00 | 2,579.9 | 1,717.5 | 569.2 | 461.9 | 107.27 | 5.306 | |
| 10,100.0 | 6,957.3 | 10,228.5 | 6,957.3 | 57.3 | 61.2 | 90.00 | 2,679.9 | 1,717.1 | 569.3 | 458.4 | 110.91 | 5.133 | |
| 10,200.0 | 6,957.3 | 10,328.5 | 6,957.3 | 59.0 | 62.9 | 90.00 | 2,779.9 | 1,716.6 | 569.4 | 454.8 | 114.56 | 4.970 | |
| 10,300.0 | 6,957.3 | 10,428.5 | 6,957.3 | 60.8 | 64.5 | 90.00 | 2,879.9 | 1,716.2 | 569.5 | 451.3 | 118.23 | 4.817 | |

| | | | |
|---|---|---|---|
| **Company:** | Great Western | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Project:** | SEC.34-T7N-R64W | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Reference Site:** | Bruegman South Pad Sec.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (11-1-13) | **Offset TVD Reference:** | Offset Datum |

**Offset Design** Bruegman South Pad Sec.34-T7N-R64W - Bruegman South EG 34-029HN - Wellbore #1 - Plan #1 (11- **Offset Site Error:** 0.0 ft

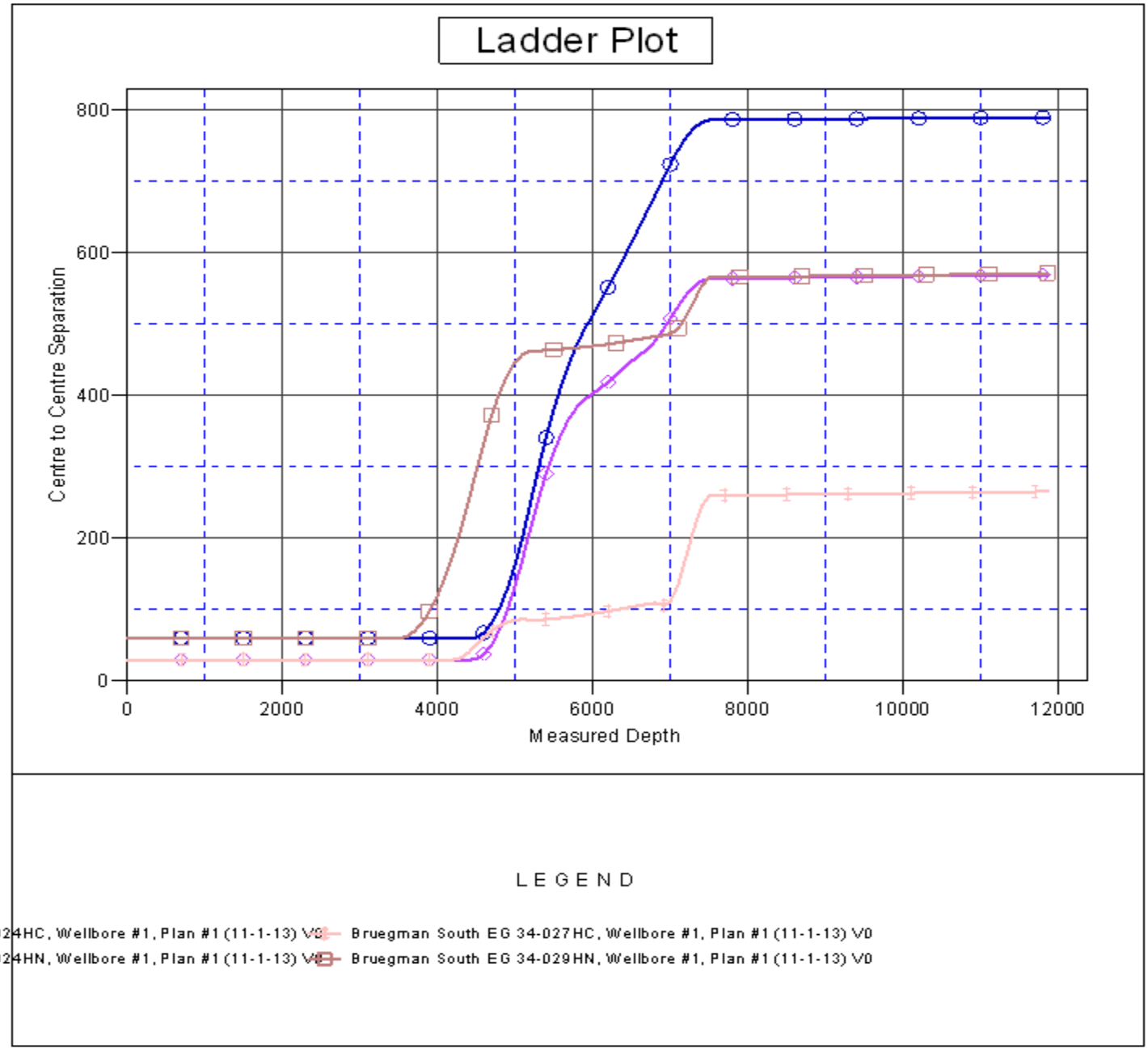
**Survey Program:** 0-MWD **Offset Well Error:** 0.0 ft

| Reference Measured Depth (ft) | Reference Vertical Depth (ft) | Offset Measured Depth (ft) | Offset Vertical Depth (ft) | Semi Major Axis Reference (ft) | Semi Major Axis Offset (ft) | Highside Toolface (°) | Offset Wellbore Centre +N/-S (ft) | Offset Wellbore Centre +E/-W (ft) | Distance Between Centres (ft) | Distance Between Ellipses (ft) | Minimum Separation (ft) | Separation Factor | Warning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10,400.0 | 6,957.3 | 10,528.5 | 6,957.3 | 62.6 | 66.2 | 90.00 | 2,979.9 | 1,715.8 | 569.7 | 447.8 | 121.90 | 4.673 | |
| 10,500.0 | 6,957.3 | 10,628.5 | 6,957.3 | 64.4 | 67.8 | 90.00 | 3,079.9 | 1,715.3 | 569.8 | 444.2 | 125.59 | 4.537 | |
| 10,600.0 | 6,957.3 | 10,728.5 | 6,957.3 | 66.2 | 69.5 | 90.00 | 3,179.9 | 1,714.9 | 569.9 | 440.6 | 129.29 | 4.408 | |
| 10,700.0 | 6,957.3 | 10,828.5 | 6,957.3 | 68.0 | 71.3 | 90.00 | 3,279.9 | 1,714.5 | 570.0 | 437.0 | 132.99 | 4.286 | |
| 10,800.0 | 6,957.3 | 10,928.5 | 6,957.3 | 69.8 | 73.0 | 90.00 | 3,379.9 | 1,714.1 | 570.2 | 433.5 | 136.71 | 4.171 | |
| 10,900.0 | 6,957.3 | 11,028.5 | 6,957.3 | 71.6 | 74.7 | 90.00 | 3,479.9 | 1,713.6 | 570.3 | 429.9 | 140.43 | 4.061 | |
| 11,000.0 | 6,957.3 | 11,128.5 | 6,957.3 | 73.4 | 76.5 | 90.00 | 3,579.9 | 1,713.2 | 570.4 | 426.3 | 144.15 | 3.957 | |
| 11,100.0 | 6,957.3 | 11,228.5 | 6,957.3 | 75.3 | 78.2 | 90.00 | 3,679.9 | 1,712.8 | 570.5 | 422.7 | 147.89 | 3.858 | |
| 11,200.0 | 6,957.3 | 11,328.5 | 6,957.3 | 77.1 | 80.0 | 90.00 | 3,779.9 | 1,712.3 | 570.7 | 419.0 | 151.63 | 3.764 | |
| 11,300.0 | 6,957.3 | 11,428.5 | 6,957.3 | 78.9 | 81.7 | 90.00 | 3,879.9 | 1,711.9 | 570.8 | 415.4 | 155.37 | 3.674 | |
| 11,400.0 | 6,957.3 | 11,528.5 | 6,957.3 | 80.8 | 83.5 | 90.00 | 3,979.9 | 1,711.5 | 570.9 | 411.8 | 159.12 | 3.588 | |
| 11,500.0 | 6,957.3 | 11,628.5 | 6,957.3 | 82.6 | 85.3 | 90.00 | 4,079.9 | 1,711.1 | 571.0 | 408.2 | 162.87 | 3.506 | |
| 11,600.0 | 6,957.3 | 11,728.5 | 6,957.3 | 84.5 | 87.1 | 90.00 | 4,179.9 | 1,710.6 | 571.2 | 404.5 | 166.63 | 3.428 | |
| 11,700.0 | 6,957.3 | 11,828.5 | 6,957.3 | 86.3 | 88.9 | 90.00 | 4,279.9 | 1,710.2 | 571.3 | 400.9 | 170.40 | 3.353 | |
| 11,800.0 | 6,957.3 | 11,928.5 | 6,957.3 | 88.2 | 90.7 | 90.00 | 4,379.9 | 1,709.8 | 571.4 | 397.3 | 174.16 | 3.281 | |
| 11,869.5 | 6,957.3 | 11,998.0 | 6,957.3 | 89.5 | 92.0 | 90.00 | 4,449.4 | 1,709.5 | 571.5 | 394.7 | 176.78 | 3.233 | SF |

| | | | |
|---|---|---|---|
| **Company:** | Great Western | **Local Co-ordinate Reference:** | Well Bruegman South EG 34-027HN |
| **Project:** | SEC.34-T7N-R64W | **TVD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Reference Site:** | Bruegman South Pad Sec.34-T7N-R64W | **MD Reference:** | WELL @ 4861.3ft (RKB - 16.5') |
| **Site Error:** | 0.0ft | **North Reference:** | True |
| **Reference Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
| **Well Error:** | 0.0ft | **Output errors are at** | 2.00 sigma |
| **Reference Wellbore** | Wellbore #1 | **Database:** | Landmark |
| **Reference Design:** | Plan #1 (11-1-13) | **Offset TVD Reference:** | Offset Datum |

Reference Depths are relative to WELL @ 4861.3ft (RKB - 16.5')
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: Bruegman South EG 34-027HN
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.62°



| | | | |
|---|---|---|---|
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| **Reference Well:** | Bruegman South EG 34-027HN | **Survey Calculation Method:** | Minimum Curvature |
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Reference Depths are relative to WELL @ 4861.3ft (RKB - 16.5')
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