# Borehole ID: KAFB-106112

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/22/2011
Date TD Reached: 2/24/2011
Date Completed: 3/2/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473505.07
X Coordinate: 1541936.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); dry; very loose; low plasticity; 70% silt; 30% very fine to medium sand; trace fine gravel to 8mm. | | Concrete Seal | Hand augered. |
| 5 | | | | | Same as above (0 ft); 60% silt; 40% very fine to coarse sand; trace fine gravel to 4mm. | | Bentonite Seal | Began drilling @ 1517 on 2/22/11. |
| 10 | | SB0058 | 0.0 | | | ML | | Blow counts (8.5-10'): 5/6. |
| | | | | | Same as above (0 ft); reddish brown (5YR 5/4); stiff; trace gravel to 8mm; angular. | | Top of Filter Pack | Kelly down @ 1522. Resumed drilling @ 1535. |
| 15 | | | | | SILT with Sand (ML); reddish brown (2.5YR 4/4); dry; stiff; nonplastic; 85% silt; 15% very fine to medium sand to 1mm. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 20 | | SB0059 | 0.0 | | Lean CLAY (CL); brown (7.5YR 5/4); dry; hard; low plasticity; 70% clay; 30% silt. | CL | | Blow counts (18.5-20'): 16/30. Kelly down @ 1543. Resumed drilling @ 1553. |
| 25 | | | | | Sandy SILT (ML); strong brown (7.5YR 5/6); dry; stiff; nonplastic; 60% silt; 35% very fine to very coarse sand; 5% fine gravel to 1cm. | ML | Bottom of Screen<br>Bentonite Seal | |
| 30 | | SB0060 | 0.0 | | | | | Blow counts (28.5-30'): 9/12. |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/26/11 11:08 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

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Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT with Sand (ML); strong brown (7.5YR 4/6); dry; very stiff; low plasticity; 70% silt; 15% clay; 15% very fine sand to 0.1mm. | | Bentonite Seal | Resumed drilling @ 1615. |
| 35 | | | | | Same as above (30 ft); 85% silt; 15% very fine to coarse sand; trace fine gravel to 6mm. | | Top of Filter Pack | |
| 40 | | SB0061 | 0.0 | | | | | Blow counts (38.5-40'): 8/15. |
| | | | | | Sandy SILT (ML); brown (7.5YR 5/4); dry; very stiff; low plasticity; 60% silt; 40% very fine to very coarse sand; trace fine gravel to 7mm. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1622. Resumed drilling @ 1633. |
| 45 | | | | | Same as above (40 ft); trace clay nodules. | ML | | |
| 50 | | SB0062 | 0.0 | | | | | Blow counts (48.5-50'): 12/22. Blow counts (50-51.5'): 12/23. Kelly down @ 1638. Resumed drilling @ 1655. |
| | | SB0063 | 0.0 | | Same as above (40 ft); very stiff. | | Bottom of Screen | |
| 55 | | | | | Same as above (40 ft). | | Bentonite Seal | |
| 60 | | | | | | | | |

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**Project Number:** 140705

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Y Coordinate: 1473505.07
X Coordinate: 1541936.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; very stiff; low plasticity; 80% silt; 20% very fine to medium sand; trace gravel to 1.5cm. | | | Driller forgot to remove 10' drill rod, drilled to 70' open hole and then hammered in casing. |
| 65 | | | | | Same as above (60 ft). | | | |
| 70 | | | | | Same as above (60 ft); trace gravel to 2.3cm. | | | Kelly down @ 1702. New connection, pushed to 70' @ 1713. End of 2/22/11. Resumed drilling @ 0745 on 2/23/11. |
| 75 | | | | | Same as above (60 ft); 80% silt; 20% very fine to medium sand; trace clay nodules. | ML | Bentonite Seal | |
| 80 | | | | | SILT with Sand (ML); strong brown (7.5YR 5/6); dry; hard; nonplastic; 85% silt; 15% very fine to coarse sand to 3mm. | | | Kelly down @ 0752. Resumed drilling @ 0758. |
| 85 | | | | | Same as above (80 ft); trace fine gravel to 5mm. | | | |
| 90 | | | | | | | | |

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Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT with Sand (ML); strong brown (7.5YR 5/6); dry; hard; nonplastic; 85% silt; 15% very fine to coarse sand to 3mm. | ML | | |
| 95 | | | | | Same as above (90 ft). | | | |
| 100 | | SB0064 | 0.0 | | Silty SAND (SM); yellowish brown (10YR 5/4); dry; very dense; 70% fine sand to 0.2mm; rounded; 30% silt. | SM | Bentonite Seal | Blow counts (98.5-100'): 30/50.<br>Kelly down @ 0810. Resumed drilling @ 0826. |
| 105 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 90% medium sand; 5% coarse sand; trace gravel to 6mm; rounded; 5% silt. | SP | | |
| 110 | | | | | Well graded SAND with Silt (SW-SM); brown (10YR 5/3); dry; loose; 85% very fine to very coarse sand; 5% fine gravel to 1cm; subrounded; 10% silt. | SW-SM | | |
| 115 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; very stiff; nonplastic; 75% silt; 25% very fine to coarse sand to 4mm. | ML | Native Backfill | |
| 120 | | | | | | | Bentonite Seal | |

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Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473505.07
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Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; very stiff; nonplastic; 85% silt; 15% very fine to fine sand to 0.5mm. | ML | | Kelly down @ 0835. Total depth with 11-3/4" casing reached. Resumed drilling @ 1230. |
| 125 | | | | | Same as above (120 ft). | ML | Bentonite Seal | |
| 130 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); moist; very stiff; low plasticity; 60% silt; 25% clay; 15% fine to medium sand to 1mm. | ML | | |
| 135 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; very stiff; low plasticity; 85% silt; 15% very fine to medium sand to 1mm. | ML | | |
| | | | | | Lean CLAY (CL). | CL | Top of Filter Pack | |
| 140 | | | | | Well graded SAND with Silt (SW-SM); brown (10YR 4/3); dry; very loose; 90% very fine to medium sand to 2mm; subrounded; 10% silt with clay nodules. | SW-SM | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1242. Resumed drilling @ 1247. |
| 145 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; loose; 95% very fine to very coarse sand; trace gravel to 6mm; subangular; 5% silt. | SW | | |
| | | SB0065 | 0.0 | | | | | Blow counts (147-148.5'): 11/15. |
| 150 | | | | | | | | |

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Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; medium dense; 95% very fine to very coarse sand; trace gravel to 6mm; subangular; 5% silt; medium to coarse sand is predominantly pumice. | SW | Bottom of Screen | Kelly down @ 1250. Resumed drilling @ 1302. |
| 155 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; very stiff; nonplastic; 80% silt; 20% very fine to medium sand to 2mm. | ML | | |
| 160 | | | | | Well graded SAND with Silt (SW-SM); brown (10YR 5/3); dry; medium dense; 90% very fine to coarse sand to 3mm; subrounded; 10% silt. | SW-SM | | Kelly down @ 1306. Resumed drilling @ 1311. |
| 165 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; very stiff; nonplastic; 85% silt; 15% very fine sand to 0.1mm. | ML | Bentonite Seal | |
| 170 | | | | | Well graded SAND with Silt (SW-SM); light brown (7.5YR 6/4); dry; loose; 80% very fine to very coarse sand; 10% fine gravel to 1.3cm; well rounded; 10% silt; predominantly pumice. | SW-SM | | |
| 175 | | | | | Same as above (170 ft); 90% very fine to very coarse sand; trace fine gravel; 10% silt. | | | |
| 180 | | | | | | | | |

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Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; very loose; 95% medium sand to 1mm; subrounded; 5% silt. | SP | | Kelly down @ 1317. Resumed drilling @ 1324. |
| 185 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; very loose; 95% very fine to very coarse sand; trace fine gravel to 1.1cm; rounded; 5% silt. | | | |
| 190 | | | | | Same as above (185 ft); finer. | | | |
| 195 | | | | | Same as above (185 ft); finer. | SW | Bentonite Seal | |
| | | SB0066 | 0.0 | | | | | Blow counts (197-198.5'): 17/12. |
| 200 | | | | | Same as above (185 ft); medium dense. | | | Resumed drilling @ 1342. |
| 205 | | | | | Silty SAND (SM); brown (10YR 4/3); dry; medium dense; 70% fine sand to 0.5mm; rounded; 30% silt. | SM | | |
| 210 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% very fine to very coarse sand; 5% fine gravel to 1.8cm; | SW | | |

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Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
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| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | rounded; 5% silt. | SW | | |
| 215 | | | | | SILT with Sand (ML); dark yellowish brown (10YR 4/4); moist; very stiff; low plasticity; 60% silt; 25% clay; 15% very fine to fine sand; trace gravel to 3cm; well rounded. | ML | | |
| 220 | | | | | Silty SAND (SM); brown (10YR 5/3); moist; loose; 75% very fine to very coarse sand; 5% fine gravel to 1.5cm; rounded; 20% silt. | SM | Bentonite Seal | Kelly down @ 1349. Resumed drilling @ 1357. |
| 225 | | | | | Same as above (220 ft); coarser gravel to 3cm. | | | |
| 230 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); dry; loose; 90% very fine to very coarse sand; 5% fine gravel to 1.5cm; rounded; 5% silt; predominantly lithics. | SW | | |
| 235 | | | | | Same as above (230 ft); grayish brown (10YR 5/2); predominantly pumice. | | Top of Filter Pack | |
| 240 | | | | | | | | |

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Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); dry; very loose; 90% very fine to very coarse sand; 5% fine gravel to 1.5cm; rounded; 5% silt; mix of pumice and lithics. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1401. |
| 245 | | | | | Same as above (240 ft); loose; predominantly lithics. | | | |
| | | SB0067 | 3.4 | | | | | Blow counts (247-248.5'): 12/43. |
| 250 | | | | | Lean CLAY (CL); brown (7.5YR 5/3); dry; hard; low plasticity; 100% clay. | CL | Bottom of Screen | Kelly down @ 1410. |
| 255 | | | | | SILT (ML); brown (7.5YR 5/3); moist; hard; low plasticity; 60% silt; 40% clay. | ML | | |
| | | | | | Same as above (252 ft). | | | |
| 260 | | | | | Same as above (252 ft); 90% silt; 10% very fine to medium sand. | | Bentonite Seal | Kelly down @ 1429. Resumed drilling @ 1435. |
| 265 | | | | | Silty SAND (SM); yellowish brown (10YR 5/4); moist; loose; 60% very fine to medium sand to 1mm; rounded; 40% silt. | SM | | |
| 270 | | | | | | | | |

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Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
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| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; very loose; 90% fine to medium sand; 10% coarse sand to 2mm; subrounded; trace fines. | | | |
| 275 | | | | | Same as above (270 ft); 90% fine sand; 10% medium sand. | SP | | |
| 280 | | | | | Same as above (270 ft). | | | Kelly down @ 1440. |
| 285 | | | | | Silty SAND (SM); brown (7.5YR 4/3); moist; loose; 70% very fine to medium sand to 1mm; rounded; 30% silt. | SM | Bentonite Seal | |
| 290 | | | | | Well graded SAND (SW); brown (7.5YR 5/2); dry; loose; 95% very fine to very coarse sand; 5% fine gravel to 8mm; subrounded. | SW | | |
| 295 | | SB0068 | 0.5 | | Poorly graded SAND (SP); brown (10YR 5/3); dry; very loose; 85% medium sand to 2mm; 15% very fine to fine sand; rounded. | SP | | Blow counts (297-298.5'): 3/Not recorded (for 18"). |
| 300 | | | | | | | | |

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X Coordinate: 1541936.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); dry; loose; 95% very fine to very coarse sand; 5% fine gravel to 9mm; subrounded to rounded. | | | Resumed drilling @ 1511. |
| 305 | | | | | Same as above (300 ft). | | | |
| 310 | | | | | Same as above (300 ft); gravel to 2.6cm. | | | |
| 315 | | | | | Same as above (300 ft); 90% very fine to very coarse sand; 10% fine gravel. | SW | Bentonite Seal | |
| 320 | | | | | Well graded SAND with Gravel (SW); 70% very fine to very coarse sand; 30% fine gravel. | | | Kelly down @ 1521. Resumed drilling @ 1528. |
| 325 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); dry; loose; 100% very fine to very coarse sand; trace fine gravel to 7mm; subrounded; trace fines. | | | |
| 330 | | | | | | | | |

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X Coordinate: 1541936.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); dry; loose; 100% very fine to very coarse sand; trace fine gravel to 7mm; subrounded; trace fines; coarser than 325'. | | Bentonite Seal | |
| 335 | | | | | Same as above (330 ft); finer. | SW | Top of Filter Pack | |
| 340 | | | | | Same as above (330 ft); finer. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1542. Resumed drilling @ 1551. |
| | | | | | Lean CLAY (CL); lense. | CL | | |
| 345 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); dry; loose; 100% very fine to coarse sand to 4mm; rounded. | SW | | |
| | | SB0069 | 0.5 | | | | | Blow counts (347-348.5'): 26/50. |
| 350 | | | | | | | Bottom of Screen | |
| | | | | | Well graded SAND with Silt (SW-SM); yellowish brown (10YR 5/4); dry; very dense; 85% very fine to very coarse sand; 5% fine gravel to 1cm; rounded; 10% silt. | SW-SM | | Kelly down @ 1605. Crew had trouble making connection. Used a different 10' section. Resumed drilling @ 1637. |
| 355 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; very dense; 95% very fine to very coarse sand to 4mm; subrounded; 5% silt. | SW | Bentonite Seal | Rate of penetration very slow. |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106112

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/22/2011
Date TD Reached: 2/24/2011
Date Completed: 3/2/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473505.07
X Coordinate: 1541936.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; very dense; 95% very fine to very coarse sand to 4mm; subrounded; 5% silt; coarser than 355'. | SW | | Kelly down @ 1650. |
| 365 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; very dense; 90% medium sand; 5% coarse sand to 2.5mm; rounded; 5% fines. | SP | | Bit packed off @ 1708. Resumed drilling @ 1709. End of day @ 1714 on 2/23/11. Resumed drilling @ 0738 on 2/24/11. |
| 370 | | | | | Same as above (365 ft); trace fine gravel to 6mm. | | | |
| 375 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; dense; 100% very fine to coarse sand to 3mm; subangular to rounded; trace fines. | SW | Bentonite Seal | |
| 380 | | | | | Same as above (375 ft); coarser. | | | Kelly down @ 0746. Resumed drilling @ 0752. |
| 385 | | | | | Same as above (375 ft). | | | |
| 390 | | | | | | | | |

# Borehole ID: KAFB-106112

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/22/2011
Date TD Reached: 2/24/2011
Date Completed: 3/2/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473505.07
X Coordinate: 1541936.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; dense; 100% very fine to coarse sand to 3mm; subangular to rounded; trace gravel to 2.5cm; trace fines. | | | |
| 395 | | | | | Same as above (390 ft); trace gravel to 1.1cm. | | | |
| | | SB0070 | 3.3 | | | | | Blow counts (397-398.5'): 6/Not Recorded. Blow counts (398.5-400'): 2/35. |
| 400 | | SB1742 | 3.3 | | Same as above (390 ft); no gravel. | | | Kelly down @ 0813. Replaced flange from cyclone hose to hammer @ 0830. Resumed drilling @ 1004. |
| 405 | | | | | Same as above (390 ft); no gravel; grading finer. | SW | Bentonite Seal | |
| 410 | | | | | Same as above (390 ft); no gravel; grading coarser. | | | |
| 415 | | | | | Same as above (390 ft); no gravel; grading coarser than 410'. | | | |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106112

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/22/2011
Date TD Reached: 2/24/2011
Date Completed: 3/2/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473505.07
X Coordinate: 1541936.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; very dense; 100% very fine to very coarse sand; trace fine gravel to 8mm; subangular to rounded; trace fines. | | | Kelly down @ 1021. Resumed drilling @ 1027. |
| 425 | | | | | Same as above (420 ft); grading coarser. | | Bentonite Seal | |
| 430 | | | | | Same as above (420 ft); 95% very fine to very coarse sand; 5% fine gravel to 2cm. | SW | | |
| 435 | | | | | Same as above (420 ft); grading finer; very fine to coarse sand to 3mm; no gravel. | | | |
| 440 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); dry; very dense; 80% very fine to very coarse sand; 20% fine gravel to 1.5cm; subrounded. | | Top of Filter Pack<br>Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1103. Resumed drilling @ 1108. |
| 445 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); moist; very dense; 95% fine sand; 5% medium sand; trace fine gravel to 1.6cm; rounded. | SP | | |
| | | SB0071 | 25.3 | | | | | Blow counts (447-478.5'): 33/50. |
| 450 | | | | | | | Bottom of Screen | |

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# Borehole ID: KAFB-106112

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/22/2011
Date TD Reached: 2/24/2011
Date Completed: 3/2/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473505.07
X Coordinate: 1541936.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | |
| | | | | | Silty SAND (SM); brown (7.5YR 4/4); moist; very dense; 80% medium sand to 1mm; rounded; 20% silt. | SM | | Kelly down @ 1123. Resumed drilling @ 1139. Drillers noted a strong odor from hole and cuttings. |
| 455 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; very dense; 100% very fine to medium sand to 1mm; subrounded. | SP | Bottom of Filter Pack | |
| | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; very dense; 100% very fine to very coarse sand to 4mm; rounded. | SW | Native Backfill | |
| 460 | | | | | | | | |
| | | | | | | | | Total depth @ 460 ft. Reached @ 1200 on 2/24/11. |
| | | | | | | | | Water added during drilling (gallons) = 0 |
| 465 | | | | | | | | |
| | | | | | | | | Water added during construction (gallons) = 230 |
| 470 | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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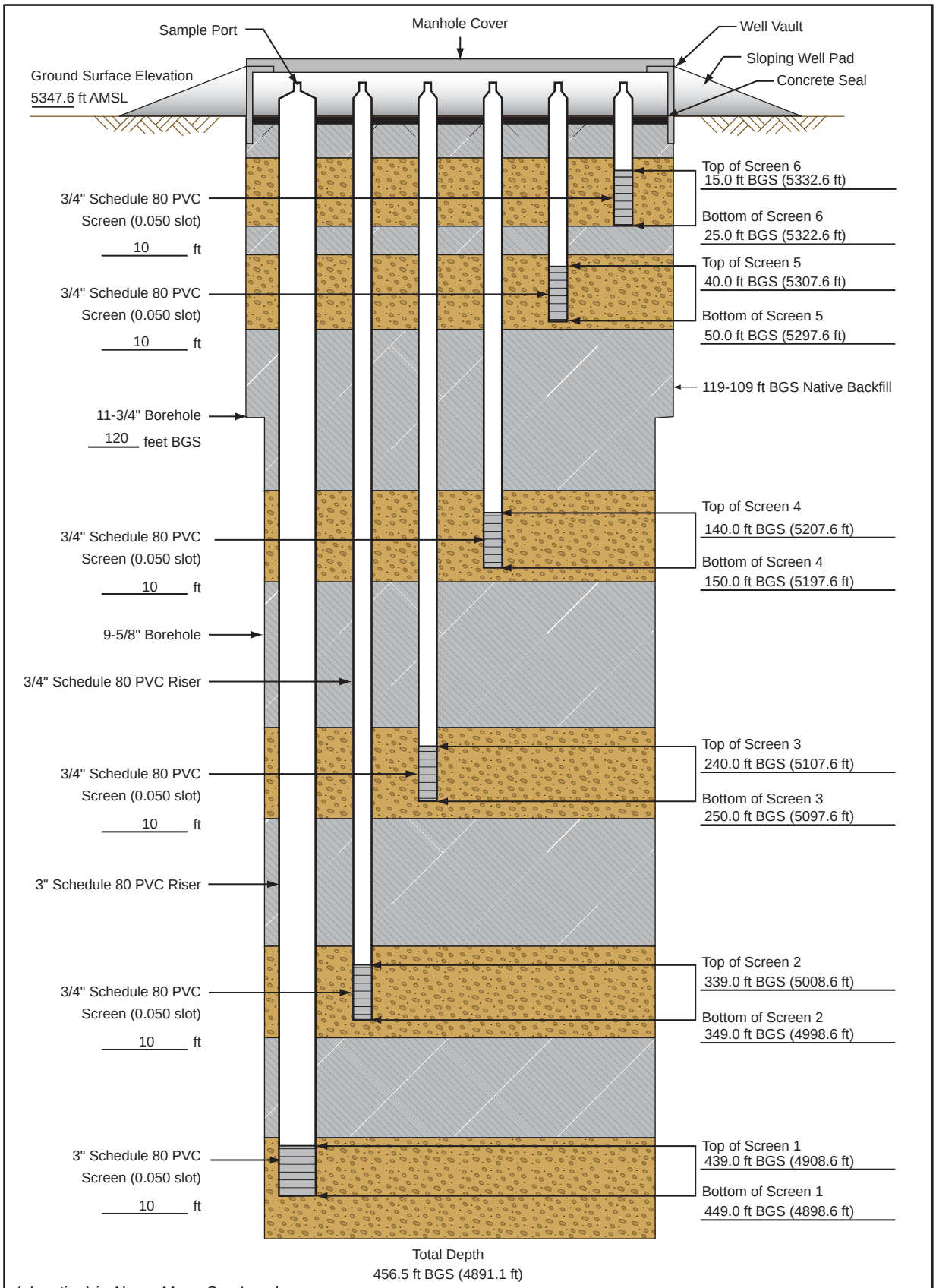
# Nested Soil Vapor Well Completion Diagram for KAFB-106112

Installation Start Date/Time: 3/1/2011 @ 8:00
Installation End Date/Time: 3/2/2011 @ 16:45



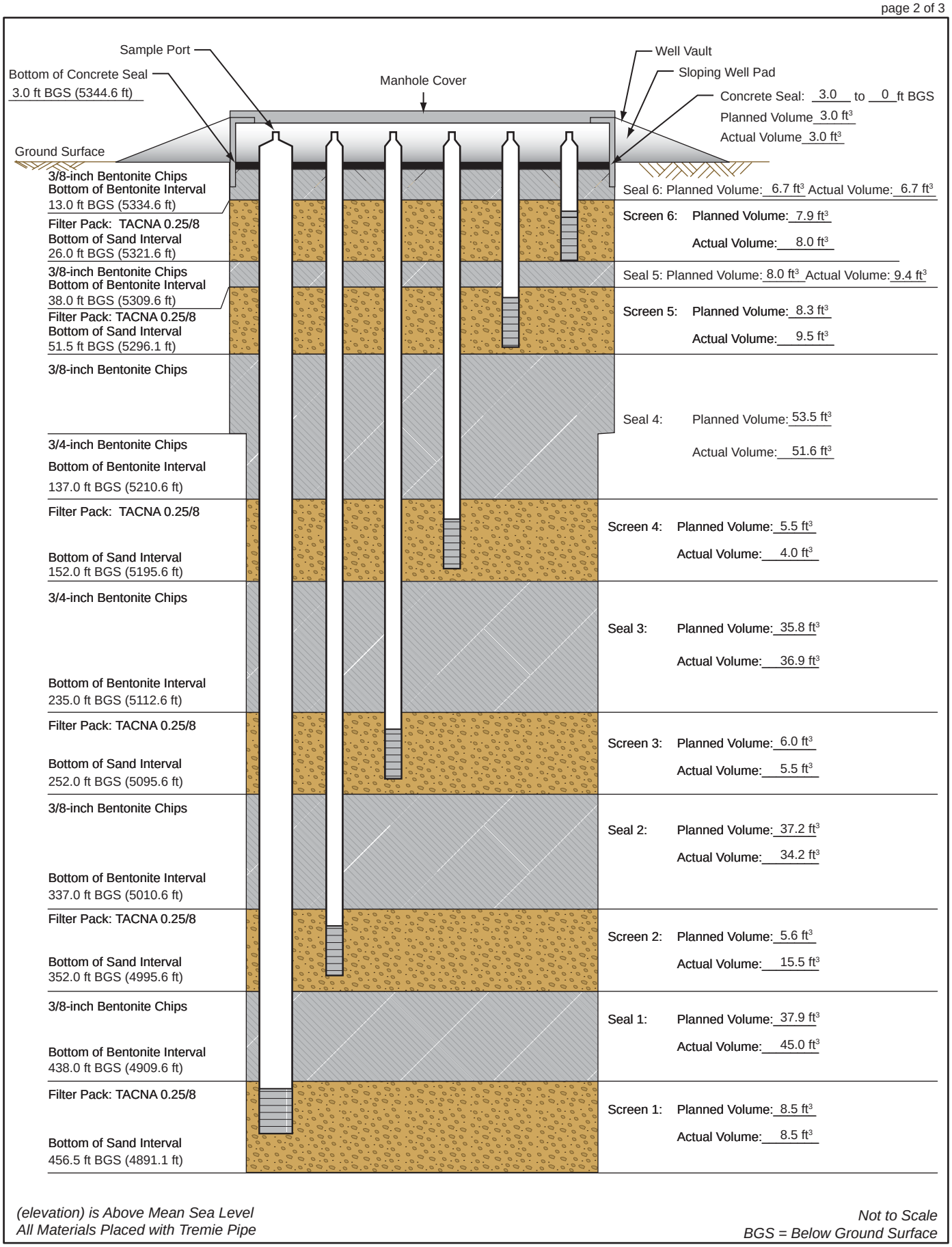



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106112






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

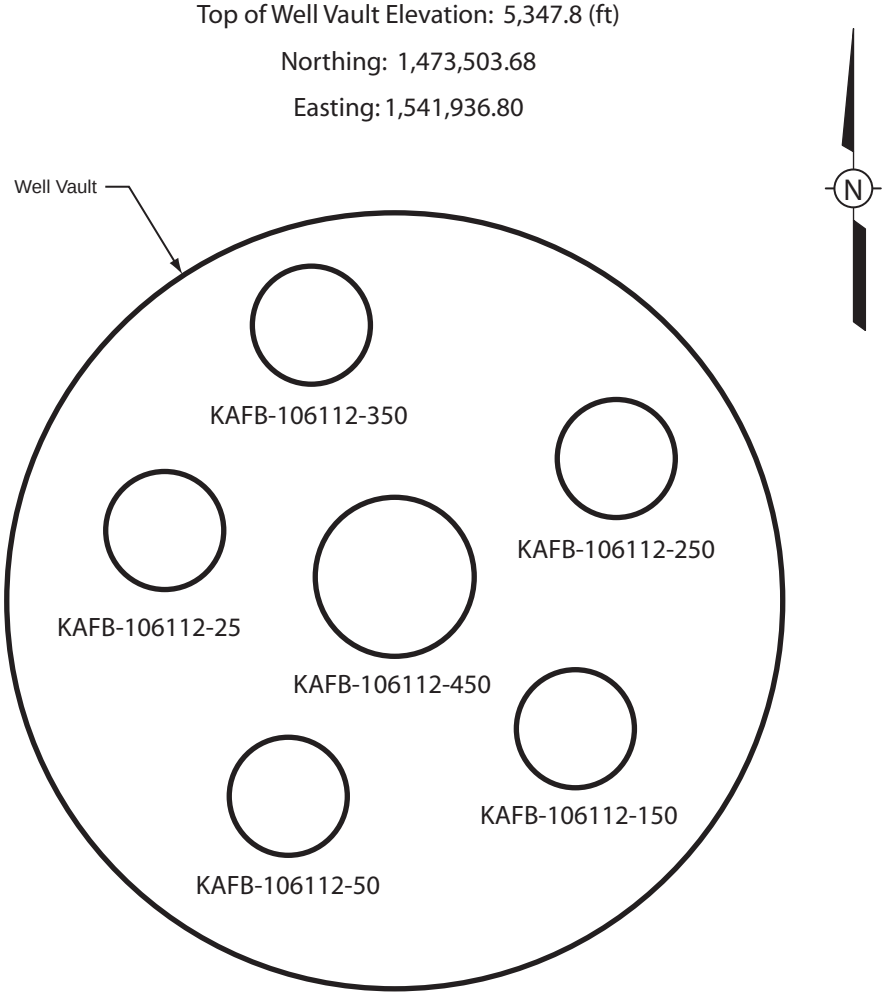
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106112



Top of Well Vault Elevation: 5,347.8 (ft)

Northing: 1,473,503.68

Easting: 1,541,936.80




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106112-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1,473,503.09 | 1,541,936.54 | 5347.2 |
| KAFB-106112-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1,473,502.85 | 1,541,936.70 | 5347.2 |
| KAFB-106112-150 | 3/4 | 150.0 | 140.0 - 150.0 | 1,473,502.95 | 1,541,936.98 | 5347.3 |
| KAFB-106112-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1,473,503.22 | 1,541,937.01 | 5347.3 |
| KAFB-106112-350 | 3/4 | 349.0 | 339.0 - 349.0 | 1,473,503.34 | 1,541,936.72 | 5347.3 |
| KAFB-106112-450 | 3 | 449.0 | 439.0 - 449.0 | 1,473,503.19 | 1,541,936.80 | 5347.3 |

# Borehole ID: KAFB-106113

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 2/5/2011
Date Completed: 2/8/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473064.22
X Coordinate: 1542004.39

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Clayey SAND (SC); reddish brown (5YR 4/4); moist; medium dense; 60% fine to coarse sand; subrounded to subangular; trace gravel to 1cm; 40% clay with minor silt; no odor. | SC | Concrete Seal | Hand augered. |
| 5 | | | | | Same as above (0 ft); no odor. | | Bentonite Seal | Spud @ 1454 on 01/18/11. |
| 10 | | | | | | | Top of Filter Pack | |
| | | SB0072 | 1.7 | | Poorly graded SAND with Silt (SP-SM); red (2.5YR 5/6); moist; very dense; 90% fine sand; 10% silt with minor clay; no odor. | SP-SM | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | New connection @ 1540. Resumed drilling @ 1544. Blow counts (10-11.5'): 48/50. Blow counts (11.5-13'): Not Recorded. |
| | | SB0080 | 1.7 | | | | | |
| 15 | | | | | Same as above (10 ft); no odor. | | | Hard to drive casing ~14-15 ft. |
| 20 | | | | | | | | Kelly down @ 1551. |
| | | SB0073 | 0.0 | | Clayey SAND (SC); reddish brown (5YR 4/4); moist; very dense; 60% fine sand; 40% clay with minor silt; no odor. | SC | Bottom of Screen | New connection @ 1628. Resumed drilling @1634. Blow counts (20-21.5'): 50/Not Recorded. Blow counts (21.5-23'): 50 Not Recorded. |
| | | SB0073 | | | | | | |
| 25 | | | | | Same as above (20 ft); no odor. | | Bentonite Seal | |
| 30 | | | | | | | | Kelly down @ 1640. New connection @ 1716. End of 01/18/11. |

# Borehole ID: KAFB-106113

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 2/5/2011
Date Completed: 2/8/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473064.22
X Coordinate: 1542004.39

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | | | | |
| | | SB0074 | 0.0 | | Clayey SAND (SC); reddish brown (5YR 4/4); moist; very dense (based on blow counts); 60% fine sand; 40% clay with minor silt; no odor. | SC | Bentonite Seal | Resumed drilling @ 0747 on 01/19/11. Blow counts (30-31.5'): 48/50. |
| 35 | | | | | Clayey SAND with Silt (SC-SM); reddish brown (5YR 4/4); moist; very dense; 75% fine sand; 25% clay and silt; no odor. | SC-SM | Top of Filter Pack | Casing followed bit without using hammer. |
| 40 | | | | | | | | Kelly down @ 0755. |
| | | SB0075 | 0.0 | | Clayey SAND (SC); reddish brown (5YR 4/4); moist; very dense (based on blow counts); 70% fine sand; 30% clay with minor silt; no odor. | SC | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | New connection @ 0826. Resumed drilling @ 0826. Blow counts (40-41.5'): 48/50. |
| 45 | | | | | Same as above (40 ft); no odor. | | | Hard to drive casing ~45'-47'. |
| 50 | | | | | | | | Kelly down @ 0840. |
| | | SB0076 | 0.0 | | Sandy lean CLAY (CL); reddish brown (5YR 4/4); moist; hard; low to medium plasticity; 70% clay with silt; 30% fine sand; no odor. | CL | Bottom of Screen | New connection @ 0914. Resumed drilling @ 0915. Blow counts (50-51.5'): 17/50. Blow counts (51.5-53'): 19/50. |
| | | SB0076 | | | | | | |
| 55 | | | | | Clayey SAND (SC); reddish brown (5YR 4/4); moist; dense; 70% fine to medium sand; 30% clay with minor silt; no odor. | SC | Bentonite Seal | |
| 60 | | | | | | | | Kelly down @ 0922. |

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# Borehole ID: KAFB-106113

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 2/5/2011
Date Completed: 2/8/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473064.22
X Coordinate: 1542004.39

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | | | | |
| | | | | | Silty SAND (SM); reddish brown (5YR 4/4); moist; very dense; 80% fine to medium sand; subangular; trace gravel to 1.5cm; 20% silt with minor clay; no odor. | SM | | New connection @ 0959. Resumed drilling @ 1000. |
| 65 | | | | | | | | |
| | | | | | SILT with Sand (ML); reddish brown (2.5YR 5/4); moist; very dense; 75% silt with minor clay; 25% fine sand; no odor. | ML | | |
| 70 | | | | | | | | |
| | | | | | Same as above (65 ft); 25% fine to coarse sand; subrounded; no odor. | | | |
| 75 | | | | | Same as above (65 ft); with trace gravel to 1cm; no odor. | | Bentonite Seal | |
| 80 | | | | | | | | Kelly down @ 1006. |
| | | | | | Sandy lean CLAY (CL); red (2.5YR 4/6); moist; medium stiff; medium plasticity; 70% clay with minor silt; 30% fine sand; no odor. | CL | | New connection @ 1021. Resumed drilling @ 1023. |
| 85 | | | | | | | | |
| | | | | | SILT with Sand (ML); red (2.5YR 4/6); moist; stiff; 75% silt with minor clay; 25% fine sand; no odor. | ML | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106113

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 2/5/2011
Date Completed: 2/8/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473064.22
X Coordinate: 1542004.39

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT with Sand (ML); red (2.5YR 4/6); moist; stiff; 80% silt with minor clay; 20% fine sand; no odor. | | | |
| 95 | | | | | Same as above (90 ft); slight increase in clay; no odor. | ML | | |
| 100 | | SB0077 | 5.4 | | | | | Blow counts (98.5-100'): 14/50. Blow counts (100-101.5'): 17/50. Kelly down @ 1031 on 01/19/11. New connection @ 1108 on 01/20/11. Resumed drilling @ 1111. |
| | | SB0077 | | | Silty SAND (SM); yellowish red (5YR 4/6); moist; stiff; 70% fine sand; 30% silt with trace clay; no odor. Note: large gravel up to 3cm in split spoon @ 102'. | SM | | |
| 105 | | | | | Well graded SAND (SW); light reddish brown (2.5YR 6/3); moist; medium dense to dense; 100% fine to coarse sand; subrounded to subangular; no odor. | | Bentonite Seal | |
| 110 | | | | | Same as above (103 ft); no odor. | SW | | |
| 115 | | | | | Poorly graded SAND (SP); light reddish brown (2.5YR 6/3); moist; medium dense; 95% fine sand; 5% silt and clay (clay as nodules); no odor. | SP | | Did not have to hammer entire joint. |
| 120 | | | | | | | | Kelly down @ 1120. |

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# Borehole ID: KAFB-106113

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 2/5/2011
Date Completed: 2/8/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473064.22
X Coordinate: 1542004.39

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT with Sand (ML); red (2.5YR 4/6); moist; 75% silt with minor clay (clay as nodules); 25% fine sand; no odor. | | | |
| 125 | | | | | Same as above (120 ft); no odor. | ML | Bentonite Seal | |
| 130 | | | | | Same as above (120 ft); no odor. | | | |
| 135 | | | | | Lean CLAY (CL); red (2.5YR 4/6); moist; stiff; medium plasticity; 95% clay with minor silt; 5% fine sand; no odor. | CL | Top of Filter Pack | |
| 140 | | | | | Same as above (133 ft); no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1211.<br>New connection @ 1218. |
| 145 | | | | | Poorly graded SAND (SP); light reddish gray (2.5YR 7/1); dry; 95% fine sand; 5% silt; no odor.<br>Same as above (141 ft); no odor. | SP | | Resumed drilling @ 1220. Likely top of Santa Fe Group. |
| 150 | | SB0078 | 0.0 | | Well graded SAND (SW); light reddish | SW | | Blow counts (148.5-150'): 9/24.<br>Kelly down @1232. End |

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# Borehole ID: KAFB-106113

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 2/5/2011
Date Completed: 2/8/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473064.22
X Coordinate: 1542004.39

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | | | | |
| | | SB0078-MS | 0.0 | | gray (2.5YR 7/1); dry; loose; 95% fine to coarse sand; subrounded; trace fine gravel to 1cm; subrounded; 5% silt; no odor. | CL | Bottom of Screen | of 01/20/11. New connection @ 0819 on 01/21/11. Resumed drilling @ 0820. Blow counts (150-151.5'): 13/50. Blow counts (151.5-153'): 18/50. |
| | | SB0078-MSD | 0.0 | | | | | |
| 155 | | | | | Sandy lean CLAY (CL); reddish brown (5YR 5/4); moist; stiff; low plasticity; 60% clay with minor silt; 40% fine sand; no odor. | | | |
| | | | | | SILT with Sand (ML); red (2.5YR 4/6); dry to moist; stiff; 85% silt; 15% fine sand; no odor. | ML | | |
| 160 | | | | | | | | Kelly down @ 0827. |
| | | | | | Poorly graded SAND with Silt (SP-SM); light reddish gray (2.5YR 7/1); dry to moist; loose; 90% fine sand; 10% silt; no odor. | | | New connection @ 0841. Resumed drilling @ 0842. |
| 165 | | | | | Same as above (160 ft); minor gravel from discharge at 167 ft; no odor. | | Bentonite Seal | |
| 170 | | | | | Same as above (160 ft); no odor. | SP-SM | | |
| 175 | | | | | Same as above (160 ft); reddish brown (2.5YR 5/4); no odor. | | | |
| 180 | | | | | | | | Kelly down @ 0853. |

# Borehole ID: KAFB-106113

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 2/5/2011
Date Completed: 2/8/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473064.22
X Coordinate: 1542004.39

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Poorly graded SAND (SP); light reddish gray (2.5YR 7/1); dry to moist; loose; 100% fine to medium sand; trace coarse sand; subrounded; no odor. | | | New connection @ 0907. Resumed drilling @ 0908. |
| 185 | | | | | Same as above (180 ft); no odor. | SP | | |
| 190 | | | | | Well graded SAND (SW); light reddish gray (2.5YR 7/1); dry to moist; 95% fine to coarse sand; subrounded to subangular; 5% fine gravel to 1cm; subrounded; no odor. | | | |
| 195 | | | | | Same as above (190 ft); no odor. | | Bentonite Seal | |
| 200 | | SB0079 | 0.0 | | Same as above (190 ft); no odor. Note: very dense based on blow counts, high blow counts to this depth may have been due to hydraulic problem with the rig. | SW | | Blow counts (198.5-200'): 48/50. Had to drive entire 20 ft joint of casing. Kelly down @ 0821. New connection @ 1110. Resumed drilling @ 1112. |
| 205 | | | | | Same as above (190 ft); no odor. | | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106113

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 2/5/2011
Date Completed: 2/8/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473064.22
X Coordinate: 1542004.39

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND (SW); light reddish brown (2.5YR 6/3); dry to moist; loose; 90% fine to coarse sand; subrounded to subangular; 10% fine gravel to 1cm; subrounded; no odor. Pumice clasts/fragments at ~211 ft. | SW | | Color change may be HC staining. |
| 215 | | | | | Well graded GRAVEL with Sand (GW); light reddish brown (2.5YR 6/3); dry to moist; loose; 85% fine to coarse gravel to 4cm; subrounded; 15% fine to coarse sand; subrounded; no odor. | GW | | |
| 220 | | | | | Same as above (213 ft); no odor. | | Bentonite Seal | Kelly down @ 1127. New connection @ 1219. Resumed drilling @ 1220. |
| 225 | | | | | Well graded SAND (SW); light reddish gray (2.5YR 7/1); dry to moist; loose; 100% fine to coarse sand; subrounded to subangular; trace fine gravel to 1cm; no odor. Pumice noted. | SW | | |
| 230 | | | | | Same as above (225 ft); no odor. | | | |
| 235 | | | | | Same as above (225 ft); no odor. | | Top of Filter Pack | |
| 240 | | | | | | | | Kelly down @ 1241. |

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# Borehole ID: KAFB-106113

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 2/5/2011
Date Completed: 2/8/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473064.22
X Coordinate: 1542004.39

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND (SW); light reddish gray (2.5YR 7/1); dry; loose; 95% fine to coarse sand; subrounded to subangular; 5% fine to coarse gravel to 3cm; subrounded to subangular; no odor. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | New connection @1250. Resumed drilling @ 1251. |
| 245 | | | | | Well graded SAND with Gravel (SW); light reddish gray (2.5YR 7/1); dry; loose; 80% fine to coarse sand; subrounded to subangular; 20% fine to coarse gravel to 4cm; subrounded; no odor. | | | |
| 250 | | SB0081 | 214.0 | | Same as above (245 ft); no odor. | | Bottom of Screen | Blow counts (248.5-250'): 27/50. Kelly down @1304 on 01/21/11. |
| | | | | | SILT (ML); reddish brown (5YR 4/3); dry to moist; stiff; 100% silt; no odor. | ML | | New connection @1143 on 01/22/11. Resumed drilling @1144. |
| 255 | | | | | Same as above (251 ft); no odor. | | | |
| | | | | | SILT (ML) reddish brown (5YR 4/3); dry to moist; stiff; 80% silt; 20% clay; no odor. | | | |
| 260 | | | | | Same as above (257 ft); no odor. | | Bentonite Seal | Kelly down @ 1155. New connection @ 1205. Resumed drilling @ 1208. Casing driving very slowly below 260 ft. |
| 265 | | | | | Poorly graded SAND with Silt (SP-SM); pale red (2.5YR 6/2); dry to moist; loose; 90% fine sand; 10% silt; no odor. | SP-SM | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106113

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 2/5/2011
Date Completed: 2/8/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473064.22
X Coordinate: 1542004.39

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND with Silt (SP-SM); pale red (2.5YR 6/2); dry to moist; loose; 90% fine sand; 10% silt; no odor. | SP-SM | | |
| 275 | | | | | Silty SAND (SM); pale red (2.5YR 6/2); dry to moist; loose; 80% very fine to fine sand; 20% silt; no odor. | SM | | Casing driving very slowly to 280 ft. |
| 280 | | | | | Poorly graded SAND (SP); light reddish gray (2.5YR 7/1); dry; loose; 95% fine sand; trace medium to coarse sand; angular to subangular; 5% silt; no odor. | SP | | Kelly down @ 1239. New connection @ 1247. Resumed drilling @ 1251. |
| | | | | | Well graded SAND (SW); light reddish gray (2.5YR 7/1); dry; loose; 95% fine to coarse sand; angular to subrounded; 5% silt; no odor. | SW | | |
| 285 | | | | | Silty GRAVEL with Sand (GM); reddish brown (5YR 5/4); dry to moist; loose; 70% fine to medium gravel to 3cm; subrounded to subangular; 15% fine to coarse sand; subrounded to subangular; 15% silt; no odor. | GM | Bentonite Seal | Casing won't drive below 285 ft. Below 285 ft, clay discharged as large, abraded nodules. |
| 290 | | | | | Lean CLAY (CL); light reddish brown (5YR 6/3); dry; very stiff; 90% clay (as nodules); 10% silt; no odor. | CL | | |
| 295 | | | | | No cuttings returned; only heavy dust (fines). | | | |
| 300 | | SB0082 | 0.0 | | | | | Blow count (298.5-300'): 19/50. Kelly down @ 1347. End of 01/22/11. |

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# Borehole ID: KAFB-106113

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 2/5/2011
Date Completed: 2/8/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473064.22
X Coordinate: 1542004.39

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | | | | |
| | | SB0082 | | | Poorly graded SAND with Gravel (SP); light reddish gray (2.5YR 7/1); dry; loose; 85% coarse sand; trace fine to medium sand; subangular to subrounded; 15% fine gravel; trace medium gravel to 3cm; no odor. Note: sample in split spoon is well graded sand with gravel (SW); blowing fines out during slow drilling. | SP | | Began 01/23/11. Fmn. is weakly consolidated to unconsolidated - could not collect sample with out sand catcher. Blow counts (300-301.5'): 12/50. Blow counts (301.5-303'): 27/50. New connection @ 1049. Resumed drilling @1058. |
| | | SB0082 | | | | | | |
| 305 | | | | | Well graded SAND with Gravel (SW); light reddish gray (2.5YR 7/1); dry; loose; 80% fine to coarse sand; subrounded; 20% fine to medium gravel to 2cm; subrounded to subangular; no odor. Heavy coarse gravel at 308 ft. | SW | | |
| 310 | | | | | Same as above (305 ft); no odor. | | | |
| 315 | | | | | Well graded GRAVEL with Sand (GW); light reddish gray (2.5YR 7/1); dry; loose; 85% fine to coarse gravel to 5cm; subrounded to subangular; 15% coarse sand; subrounded to subangular; no odor; gravel consists of lithics and mineral clasts (granite, dacite, feldspar, quartzite). Same as above (315 ft); sand is fine to coarse; no odor. | GW | Bentonite Seal | |
| 320 | | | | | | | | Kelly down @ 1116. New connection @ 1126. Resumed drilling @1127. |
| 325 | | | | | Well graded SAND (SW); reddish brown (5YR 5/4); dry to moist; loose; 95% fine to coarse sand; subangular; 5% silt; no odor. Same as above (322 ft); trace gravel to 3cm; no odor. | SW | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106113

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 2/5/2011
Date Completed: 2/8/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473064.22
X Coordinate: 1542004.39

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND (SW); light reddish gray (2.5YR 7/1); dry; loose; 90% fine to coarse sand; subangular to subrounded; 10% fine to coarse gravel to 5cm; subrounded; no odor. | | Bentonite Seal | |
| 335 | | | | | Same as above (330 ft); no odor. | | | |
| | | | | | | SW | Top of Filter Pack | |
| 340 | | | | | Same as above (330 ft); 95% sand; 5% gravel; no odor; higher percentage of fine to medium sand. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1147. New connection @ 1157. Resumed drilling @ 1158. |
| 345 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); light reddish gray (2.5YR 7/1); dry; loose; 95% fine sand; some medium sand; subrounded to subangular; 5% silt; no odor. | SP | | |
| 350 | | SB0083 | 0.1 | | | | | Blow counts (348.5-350'): 21/50. Blow counts: (350-351.5'): 27/50. Kelly down @ 1216. New connection @ 1242. Resumed drilling @1243. |
| | | SB0083 | | | Poorly graded SAND with Silt (SP-SM); light reddish brown (5YR 6/4); dry to moist; loose; 90% very fine to fine sand; trace medium sand; 10% silt; no odor. | | Bottom of Screen | |
| 355 | | | | | Same as above (350 ft); minor medium to coarse sand; subrounded to subangular; trace fine gravel to 1.5cm; subrounded; no odor. | SP-SM | Bentonite Seal | Hammer stopped firing @ 1301, stopped advancing. Resumed advancing @ 1325. Stopped at ~357 ft @ 1335. Resumed attempting to advance @ |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106113

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 2/5/2011
Date Completed: 2/8/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473064.22
X Coordinate: 1542004.39

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Poorly graded SAND (SP); light reddish gray (2.5YR 7/1); dry; loose; 95% very fine to fine sand; 5% silt; no odor. | | | 1412. Kelly down @ 1425. End of 01/23/11. Began 02/05/11 - Tripped out all 9-5/8" casing between 01/23/11 and 02/03/11. Had slough to 139 ft bgs with casing out of hole (likely base of younger alluvium). New connection @ 0911. Resumed drilling @ 0912. |
| 365 | | | | | Same as above (360 ft); trace medium to coarse sand; subangular; no odor. | SP | | |
| 370 | | | | | Well graded SAND (SW); light reddish gray (2.5 YR 7/1); dry; loose; 95% fine to coarse sand; subangular to subrounded; 5% silt; no odor. | | | |
| 375 | | | | | Same as above (370 ft); no odor; gravel from discharge below 375 ft; chert gravel noted. | SW | Bentonite Seal | |
| 380 | | | | | Well graded SAND (SW); light reddish gray (2.5YR 7/1); dry to moist; loose; 90% fine to coarse sand; subangular to subrounded; 5% fine to coarse gravel; subangular to subrounded; 5% silt; no odor. | | | Kelly down @ 0930. New connection @ 0943. Resumed drilling @ 0944. |
| 385 | | | | | Poorly graded SAND (SP); light reddish gray (2.5YR 7/1); dry; loose; 95% fine to medium sand; trace coarse sand; subangular to subrounded; 5% silt; no odor. | SP | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106113

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 2/5/2011
Date Completed: 2/8/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473064.22
X Coordinate: 1542004.39

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); light reddish gray (2.5YR 7/1); dry; loose; 95% fine to medium sand; trace coarse sand; subangular to subrounded; 5% silt; no odor. | SP | | |
| 395 | | | | | Well graded SAND (SW); light reddish gray (2.5YR 7/1); dry; loose; 100% fine to coarse sand; subangular to subrounded; trace fine gravel to 0.5cm; subrounded. | SW | | |
| 400 | | SB0084 | 9.9 | | | | | Blow counts (398.5-400'): 6/NR. Blow counts: (400-401.5'): 9/50. Kelly down @ 1002. New connection @ 1327. Resumed drilling @ 1335. |
| | | SB0084 | | | Same as above (395 ft); no odor. | | | |
| 405 | | | | | Same as above (395 ft); no odor. | | Bentonite Seal | |
| 410 | | | | | Poorly graded SAND (SP); light reddish gray (2.5YR 7/1); dry to moist; loose; 95% fine sand; trace medium to coarse sand; angular to subrounded; 5% silt; no odor. | SP | | |
| 415 | | | | | Same as above (410 ft); 95% very fine to fine sand; trace medium to coarse sand; subangular to subrounded; 5% silt; no odor. | | | |
| 420 | | | | | | | | Kelly down @ 1356. |

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# Borehole ID: KAFB-106113

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 2/5/2011
Date Completed: 2/8/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473064.22
X Coordinate: 1542004.39

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND with Silt (SP-SM); light reddish brown (2.5YR 7/1); dry to moist; loose; 90% very fine to fine sand; trace medium sand; 10% silt; no odor. | SP-SM | | New connection @ 1403. Resumed drilling @ 1403. |
| 425 | | | | | Poorly graded SAND (SP); light reddish brown (2.5YR 7/1); dry to moist; loose; 95% fine sand; trace medium sand; 5% silt; no odor. | SP | Bentonite Seal | The interval from 425 ft to 435 ft consists of interbedded fine to coarse sands and fine to coarse gravels. |
| 430 | | | | | Well graded SAND (SW); light reddish gray (2.5YR 7/1); dry to moist; loose; 100% fine to coarse sand; subangular to subrounded; trace fine gravel to 12cm; subrounded; no odor. | | | |
| 435 | | | | | Same as above (430 ft); no odor. | | Top of Filter Pack | |
| 440 | | | | | Same as above (430 ft); no gravel; no odor. | SW | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1423. New connection @ 1430. Resumed drilling @ 1431. |
| 445 | | | | | Same as above (430 ft); no odor; gravel lense at 447 ft. | | | |
| 450 | X | SB0085 | 3.2 | | | | | Blow counts (448.5-450'): 37/50. |

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# Borehole ID: KAFB-106113

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 2/5/2011
Date Completed: 2/8/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473064.22
X Coordinate: 1542004.39

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | |
| | | SB0085 | | | Well graded SAND (SW); light reddish gray (2.5YR 7/1); dry to moist; loose; 100%fine to coarse sand subangular to subrounded; large gravel and cobbles noted in sample; no odor; slight odor from headspace sample. | SW | Bottom of Screen | Blow counts (450-451.5): 48/50. |
| 455 | | | | | | | | |
| | | | | | | | | Total depth = 457 ft. Reached @ 1540 on 2/8/11. |
| 460 | | | | | | | | Water added during drilling = 0 |
| | | | | | | | | Water added during construction = Not Recorded |
| 465 | | | | | | | | Spud: started drilling from surface. |
| 470 | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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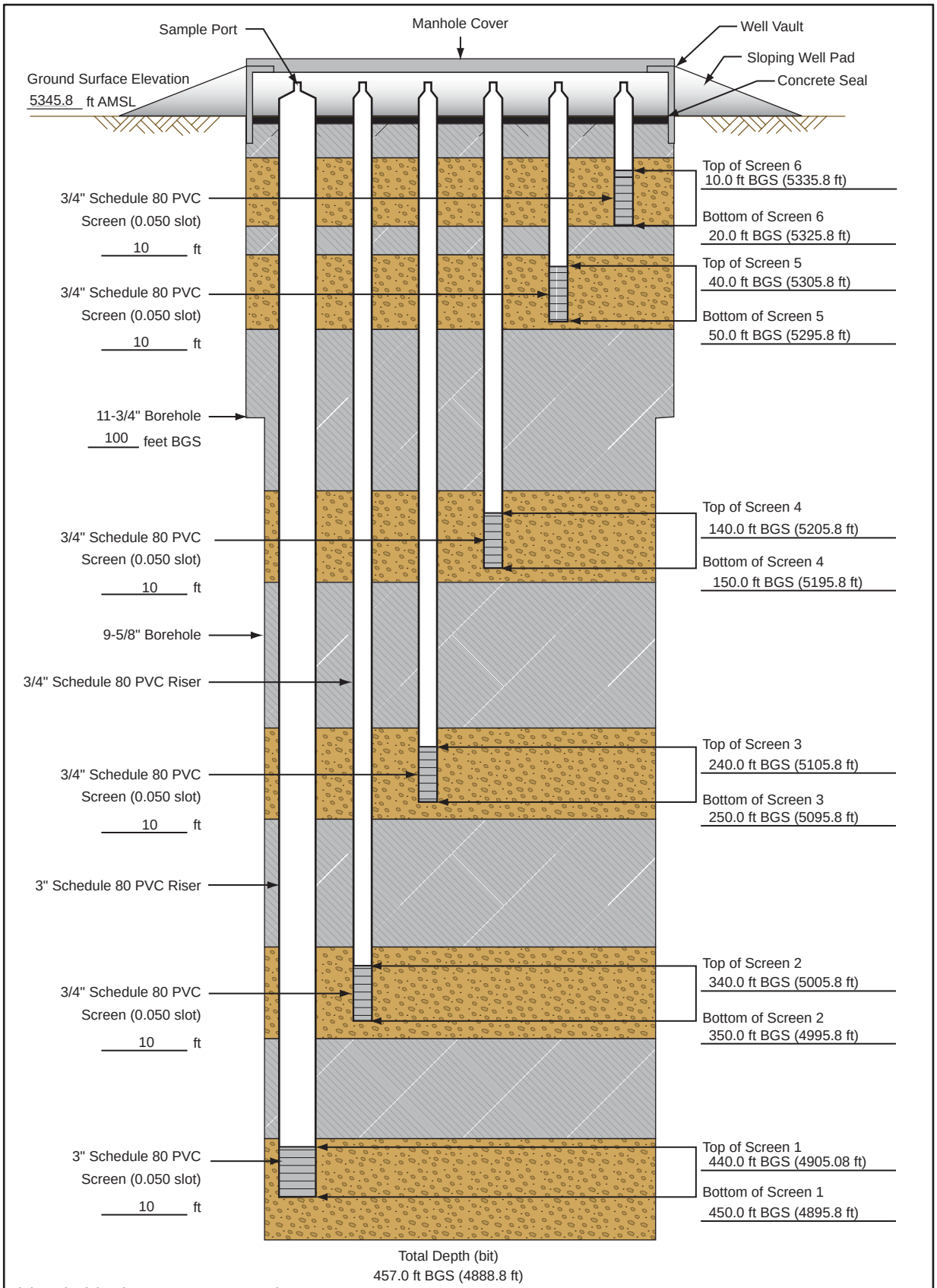
# Nested Soil Vapor Well Completion Diagram for KAFB-106113

Installation Start Date/Time: 2/5/2011 @ 08:08
Installation End Date/Time: 2/8/2011 @ 10:51



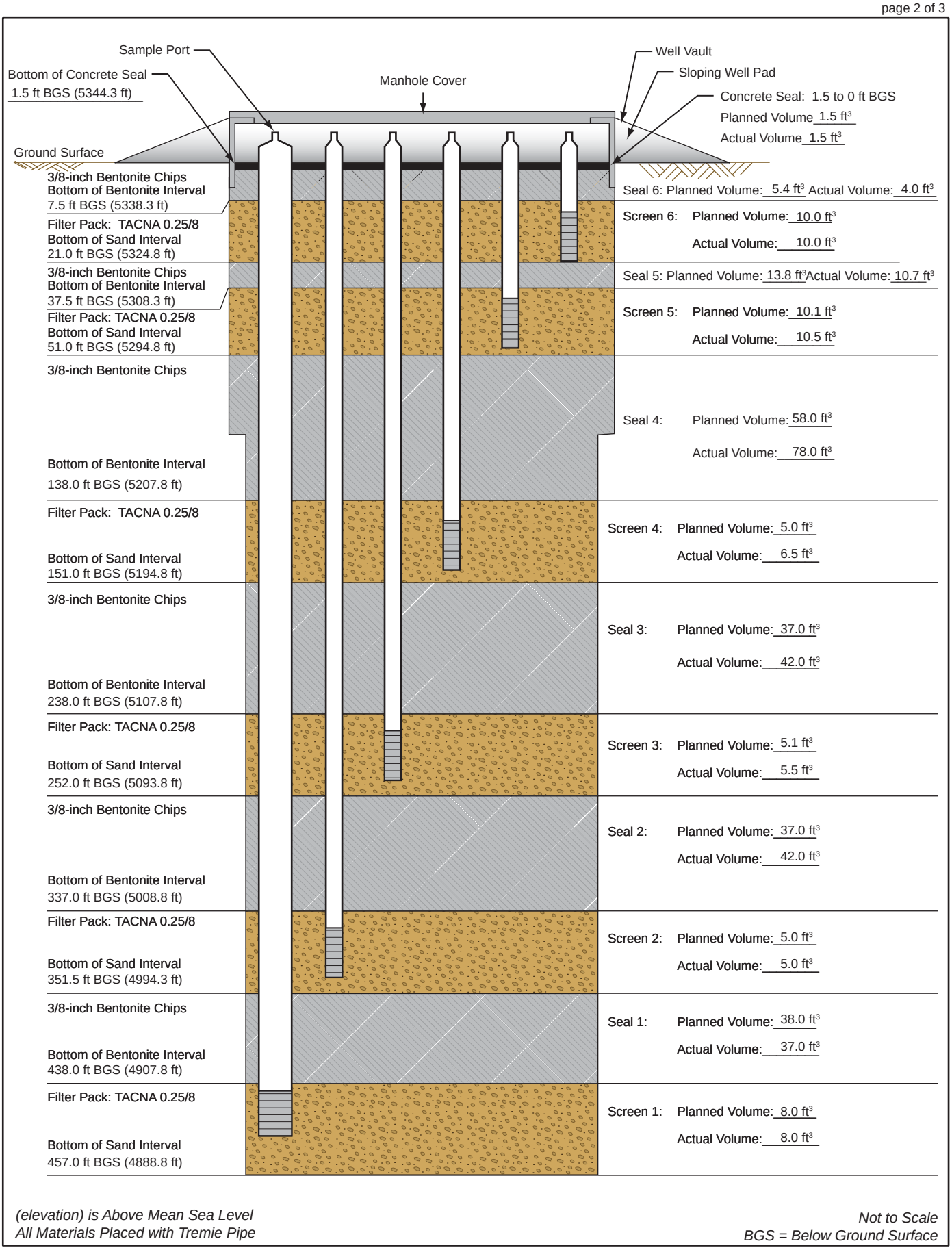



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106113






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

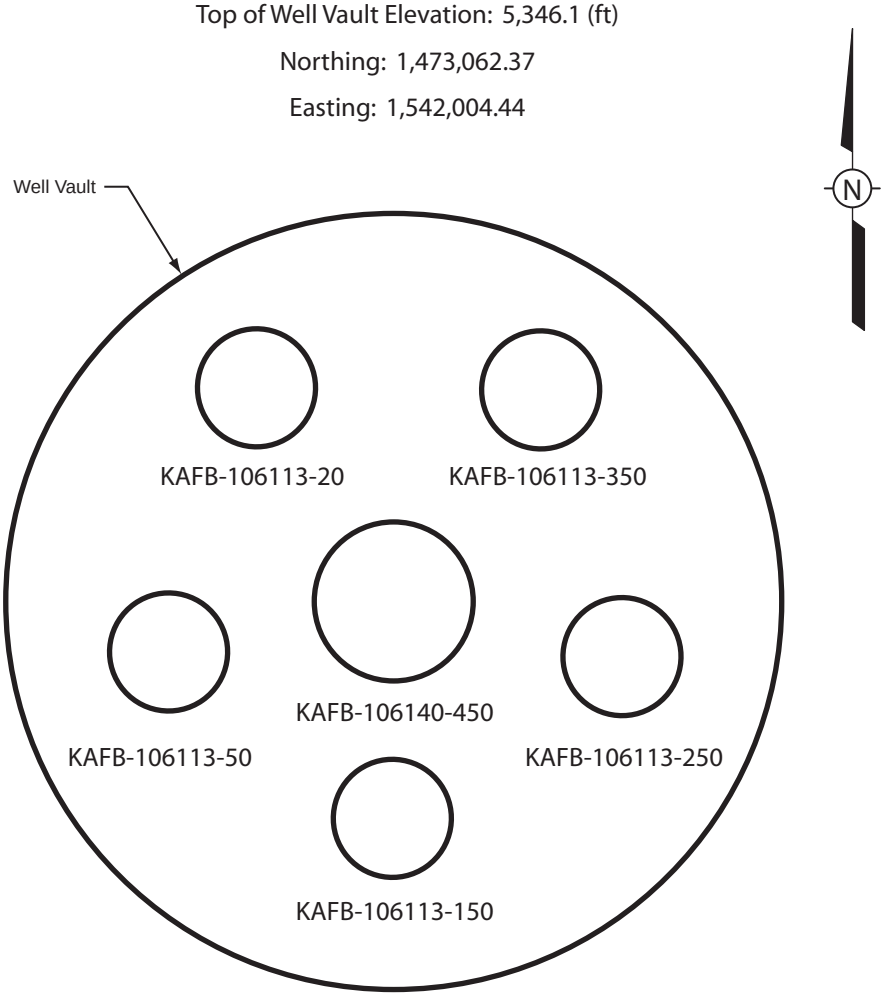
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106113



Top of Well Vault Elevation: 5,346.1 (ft)

Northing: 1,473,062.37

Easting: 1,542,004.44




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106113-20 | 3/4 | 20.0 | 10.0-20.0 | 1,473,062.15 | 1,542,004.37 | 5,345.5 |
| KAFB-106113-50 | 3/4 | 50.0 | 40.0-50.0 | 1,473,061.84 | 1,542,004.23 | 5,345.5 |
| KAFB-106113-150 | 3/4 | 150.0 | 140.0-150.0 | 1,473,061.65 | 1,542,004.48 | 5,345.5 |
| KAFB-106113-250 | 3/4 | 250.0 | 240.0-250.0 | 1,473,061.80 | 1,542,004.79 | 5,345.5 |
| KAFB-106113-350 | 3/4 | 350.0 | 340.0-350.0 | 1,473,062.07 | 1,542,004.70 | 5,345.6 |
| KAFB-106113-450 | 3 | 450.0 | 440.0-450.0 | 1,473,062.01 | 1,542,004.50 | 5,345.6 |

# Borehole ID: KAFB-106114

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/20/2011
Date TD Reached: 2/23/2011
Date Completed: 3/1/2011

Ground Elevation AMSL (ft): 5344.8
Y Coordinate: 1473064.09
X Coordinate: 1541796.70

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | SILT with Sand (ML); red (2.5YR 5/6); moist; 80% silt with clay; 20% very fine to fine sand; subrounded to subangular. | | Concrete Seal | Hand augered. |
| 5 | | | | | Same as above (0 ft); no odor. | | Bentonite Seal | Began drilling @ 1415 on 2/20/11. |
| 10 | | SB0086 | 0.1 | | Same as above (0 ft); hard; gravel lense 12-13'. | ML | Top of Filter Pack | Blow counts (9-10.5'): 12/19/23. New 10' connection @ 1440. |
| 15 | | | | | Same as above (0 ft); red (2.5YR 4/8); no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 20 | | SB0087 | 0.1 | | Lean CLAY (CL); red (2.5YR 5/6); dry; firm; low plasticity; 60% clay; 30% silt; 10% sand; no odor. | | | Blow counts (19-20.5'): 13/27/34. New connection @ 1505. |
| 25 | | | | | Same as above (20 ft); less clay; more silt; no odor. | CL | Bottom of Screen<br>Bentonite Seal | |
| 30 | | SB0088 | 0.2 | | | | | Blow counts (29-30.5'): |

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# Borehole ID: KAFB-106114

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/20/2011
Date TD Reached: 2/23/2011
Date Completed: 3/1/2011

Ground Elevation AMSL (ft): 5344.8
Y Coordinate: 1473064.09
X Coordinate: 1541796.70

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | | | | |
| | | SB0089 | 0.2 | | SILT with Sand (ML); reddish brown (5YR 5/4); moist; soft; 55% silt; 20% clay; 25% sand; no odor. | ML | Bentonite Seal | 12/18/32. Blow counts (30.5-32'): Not Recorded. New 10' connection @ 1525. |
| 35 | | | | | Lean CLAY with Sand (CL); red (2.5YR 5/6); dry; firm; 80% clay; 15% sand; 5% gravel; no odor. | CL | Top of Filter Pack | |
| 40 | | SB0090 | 0.3 | | Sandy Lean CLAY (CL); red (2.5YR 4/6); dry; stiff; 65% clay; 30% sand; 5% gravel. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Blow counts (39-40.5'): 7/14/26. New 10' connection @ 1545. |
| 45 | | | | | Same as above (40 ft); reddish brown (2.5YR 4/4). | | | |
| 50 | | SB0091 | 0.3 | | Same as above (40 ft). | | Bottom of Screen | Blow counts (49-50.5'): 11/14/21. New 10' connection @ 1605. |
| 55 | | | | | Poorly graded SAND with Silt and Gravel (SP-SM); reddish brown (5YR 5/4); dry; loose to medium dense; 60% coarse sand; 30% gravel; angular to subrounded; 10% silt; no odor. | SP-SM | Bentonite Seal | |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106114

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/20/2011
Date TD Reached: 2/23/2011
Date Completed: 3/1/2011

Ground Elevation AMSL (ft): 5344.8
Y Coordinate: 1473064.09
X Coordinate: 1541796.70

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT (ML); red (2.5YR 4/8); moist; soft; 70% silt; 30% clay. | ML | | New 10' connection @ 1625. |
| 65 | | | | | Same as above (60 ft). | | | |
| 70 | | | | | Same as above (60 ft); gravel fragments at 72'. | | | New 20' connection @ 1645. |
| 75 | | | | | Lean CLAY (CL); yellowish red (5YR 5/6); dry; stiff; non to low plasticity; 55% clay; 40% silt; 5% sand; no odor. | CL | Bentonite Seal | |
| 80 | | | | | Same as above (75 ft). | | | |
| 85 | | | | | Same as above (75 ft); reddish brown (5YR 4/3); hard. | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106114

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/20/2011
Date TD Reached: 2/23/2011
Date Completed: 3/1/2011

Ground Elevation AMSL (ft): 5344.8
Y Coordinate: 1473064.09
X Coordinate: 1541796.70

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Sandy lean CLAY (CL); yellowish brown (10YR 5/4); dry; stiff; medium plasticity; no odor. | CL | | New 10' connection. |
| 95 | | | | | Silty SAND (SM); pale brown (10YR 6/3); moist; medium dense to dense; 80% fine sand; 20% silt. | SM | | |
| 100 | | SB0092 | 0.0 | | Same as above (95 ft); some gravel fragments. | | | Blow counts (99-100.5'): 15/26/35. New 20' connection @ 0805 on 2/21/11. |
| 105 | | | | | Same as above (95 ft). | | Bentonite Seal | |
| 110 | | | | | Well graded GRAVEL (GW); reddish yellow (10YR 6/6); dry; 90% gravel; 10% coarse sand; subrounded; no odor. | GW | | |
| 115 | | | | | SILT (ML); yellowish red; moist; non to low plasticity; 90% silt; 10% clay; no odor. | ML | | |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106114

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/20/2011
Date TD Reached: 2/23/2011
Date Completed: 3/1/2011

Ground Elevation AMSL (ft): 5344.8
Y Coordinate: 1473064.09
X Coordinate: 1541796.70

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Lean CLAY (CL); light brown (7.5YR 6/4); dry; hard; low plasticity; 75% clay; 25% silt; some angular gravel fragments; no odor. | | | New 20' connection @ 1320. |
| 125 | | | | | Same as above (120 ft). | CL | | |
| 130 | | | | | Same as above (120 ft); yellowish red (5YR 5/6); no gravel. | | Bentonite Seal | |
| 135 | | | | | Poorly graded SAND with Silt (SP-SM); light brown (7.5YR 6/3); moist; medium dense; 85% fine sand; 5% gravel; 10% silt; no odor. | | Top of Filter Pack | |
| 140 | | | | | Same as above (135); no gravel. | SP-SM | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | New 10' connection @ 1700. |
| 145 | | | | | Same as above (135 ft); reddish yellow (7.5YR 6/6). | | | |
| 150 | X | SB0093 | 0.1 | | | | | Blow counts (149-150.5'): |

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# Borehole ID: KAFB-106114

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/20/2011
Date TD Reached: 2/23/2011
Date Completed: 3/1/2011

Ground Elevation AMSL (ft): 5344.8
Y Coordinate: 1473064.09
X Coordinate: 1541796.70

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Poorly graded SAND with Silt (SP-SM); light brown (7.5YR 6/3); moist; medium dense; 85% fine sand; 5% gravel; 10% silt; no odor. | SP-SM | Bottom of Screen | 19/17/26. New 10' connection @ 0815 on 2/22/11. |
| 155 | | | | | Well graded SAND (SW); light brown (7.5YR 6/3); dry to moist; dense; 90% fine to coarse sand; 10% gravel; angular to subrounded; no odor. | | | |
| 160 | | | | | Same as above (153 ft); no gravel; more fine grained; moderately sorted. | | | New 10' connection @ 0900. |
| 165 | | | | | Same as above (153 ft); becomes poorly graded. | SW | Bentonite Seal | |
| 170 | | | | | Same as above (153 ft). | | | New 10' connection @ 0915. |
| 175 | | | | | Same as above (153 ft); small gravel. | | | |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106114

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/20/2011
Date TD Reached: 2/23/2011
Date Completed: 3/1/2011

Ground Elevation AMSL (ft): 5344.8
Y Coordinate: 1473064.09
X Coordinate: 1541796.70

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND (SW); light brown (7.5YR 6/3); dry to moist; dense; 90% fine to coarse sand; 10% gravel; angular to subrounded; no odor. | | | New 20' connection @ 0925. |
| 185 | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/3); dry; 80% sand; 20% coarse gravel; subangular to subrounded. | | | |
| 190 | | | | | Same as above (185 ft). | SW | | |
| 195 | | | | | Same as above (185 ft). | | Bentonite Seal | |
| 200 | | SB0094 | 0.4 | | | | | Blow counts (199-200.5'): 12/19/37. Blow counts (200.5-202'): 6/12/28. New 20' connection @ 1015. |
| | | SB0094-MS | | | Poorly graded SAND (SP); light brown (7.5YR 6/3); moist; 95% fine sand; 5% gravel; no odor. | | | |
| | | SB0094-MSD | 0.4 | | | | | |
| 205 | | | | | Same as above (200 ft). | SP | | |
| 210 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/26/11 11:24 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106114

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/20/2011
Date TD Reached: 2/23/2011
Date Completed: 3/1/2011

Ground Elevation AMSL (ft): 5344.8
Y Coordinate: 1473064.09
X Coordinate: 1541796.70

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded SAND with Gravel (SP); light brown (7.5YR 6/3); moist; 60% sand; 40% gravel to 1.5cm. | SP | | |
| 215 | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/3); dry; loose; gravel to 2cm; subangular to subrounded; no odor. | SW | Bentonite Seal | New 20' connection @ 1025. |
| 220 | | | | | Well graded SAND (SW); light brown (7.5YR 6/4); moist; medium dense; 90% sand; 10% coarse gravel; subangular to subrounded; no odor. | | | |
| 225 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/4); moist; dense; 95% fine sand; 5% fines; no odor. | SP | | |
| 230 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/4); moist; dense to medium dense; 95% sand; 5% gravel and fines. | | Top of Filter Pack | |
| 235 | | | | | Same as above (230 ft). | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106114

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/20/2011
Date TD Reached: 2/23/2011
Date Completed: 3/1/2011

Ground Elevation AMSL (ft): 5344.8
Y Coordinate: 1473064.09
X Coordinate: 1541796.70

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded GRAVEL with Sand (GW); pinkish gray (7.5YR 4/2); dry; loose; 60% gravel; 40% coarse sand; subangular to angular; no odor. | GW | | New 10' connection @ 1100. |
| 245 | | | | | Lean CLAY (CL); reddish brown (5YR 5/3); dry to moist; soft to firm; non to low plasticity; no odor. | | Bottom of Screen | |
| 250 | | SB0095 | 0.7 | | Same as above (245 ft); stiff. | CL | | Blow counts (249-250.5'): 27/36/50. New 10' connection @ 1155. |
| 255 | | | | | Same as above (245 ft). | | Bentonite Seal | |
| 260 | | | | | Well graded SAND with Clay and Gravel (SW-SC); brown (7.5YR 4/4); moist; medium dense to dense; 60% sand; 30% coarse gravel; 10% clay and silt; no odor. | SW-SC | | New 20' connection @ 1205. |
| 265 | | | | | Poorly graded SAND with Clay (SP-SC); light brown (7.5YR 6/4); moist; dense; 90% coarse sand; 10% clay and silt; no odor. | SP-SC | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106114

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/20/2011
Date TD Reached: 2/23/2011
Date Completed: 3/1/2011

Ground Elevation AMSL (ft): 5344.8
Y Coordinate: 1473064.09
X Coordinate: 1541796.70

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND with Clay (SP-SC); light brown (7.5YR 6/4); moist; dense; 90% coarse sand; 10% clay and silt; no odor. | | | |
| 275 | | | | | Same as above (270); slight odor. | SP-SC | | |
| 280 | | | | | Same as above (270 ft); slight odor. | | | New 20' connection @ 1315. |
| | | | | | Lean CLAY (CL); light brown (7.5YR 6/3); dry; hard; nonplastic; 90% clay with silt; 10% sand; no odor. | | | |
| 285 | | | | | Same as above (281 ft). | CL | Bentonite Seal | |
| 290 | | | | | Poorly graded SAND with Gravel (SP); light brown (7.5YR 6/3); moist; medium dense; 70% sand; 30% gravel to 1cm; angular to subrounded; no odor. | | | |
| 295 | | | | | Same as above (290 ft); more gravel. | SP | | |
| 300 | X | SB0096 | 1.1 | | | | | Blow counts (299-300.5'): |

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# Borehole ID: KAFB-106114

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/20/2011
Date TD Reached: 2/23/2011
Date Completed: 3/1/2011

Ground Elevation AMSL (ft): 5344.8
Y Coordinate: 1473064.09
X Coordinate: 1541796.70

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | SB1743 | 1.1 | | Well graded GRAVEL (GW); brown (7.5YR 5/3); dry; loose; 90% gravel to 5cm; 10% coarse sand; subangular to rounded; no odor. | | | 8/16/27. Blow counts (300.5-302'): 7/14/26. New 20' connection @ 1645. |
| 305 | | | | | Same as above (300 ft); gravel to 0.5cm; more sand; finer. | GW | | |
| 310 | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/4); dry; loose; 85% sand; 15% fine gravel to 0.5cm; no odor. | | | |
| 315 | | | | | Same as above (310 ft); some gravel; finer. | | Bentonite Seal | |
| 320 | | | | | Same as above (310 ft). | SW | | New connection @ 0800 on 2/23/11. |
| 325 | | | | | Same as above (310 ft); finer. | | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106114

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/20/2011
Date TD Reached: 2/23/2011
Date Completed: 3/1/2011

Ground Elevation AMSL (ft): 5344.8
Y Coordinate: 1473064.09
X Coordinate: 1541796.70

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/4); dry; loose; 85% sand; 15% fine gravel to 0.5cm; no odor. | | | |
| 335 | | | | | Same as above (330 ft). | SW | Bentonite Seal | New 10' connection @ 0910. |
| | | | | | | | Top of Filter Pack | |
| 340 | | | | | Well graded GRAVEL with Sand (GW); pinkish gray (7.5YR 7/2); dry; loose; 70% gravel to 1cm; 30% coarse sand; subrounded to subangular; no odor. | GW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 345 | | | | | Well graded SAND (SW); light brown (7.5YR 6/3); dry; loose; 100% sand; no odor. | | | |
| 350 | | SB0097 | 0.3 | | | | Bottom of Screen | Blow counts (349-350.5'): 11/49/50. New 10' connection @1025. |
| | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/3); dry; loose; 70% sand; 30% gravel to 3cm; subangular to rounded; no odor. | SW | | |
| 355 | | | | | Well graded SAND with Gravel (SW); brown (7.5YR 5/4); moist; medium dense; 60% sand; 40% gravel to 2cm; angular to subrounded; no odor. | | Bentonite Seal | |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106114

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/20/2011
Date TD Reached: 2/23/2011
Date Completed: 3/1/2011

Ground Elevation AMSL (ft): 5344.8
Y Coordinate: 1473064.09
X Coordinate: 1541796.70

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND (SW); brown (7.5YR 5/4); moist; medium dense; 100% sand; angular to subrounded; no odor. | SW | | New 20' connection @ 1040. |
| 365 | | | | | Same as above (360 ft). | | | |
| 370 | | | | | Poorly graded SAND (SP); pinkish gray (7.5YR 6/2); dry; loose; 100% sand; no odor. | SP | | |
| | | | | | Same as above (367 ft). | | | |
| 375 | | | | | Well graded SAND with Gravel (SW); pinkish gray (7.5YR 6/2); dry; loose to medium dense; 55% sand; 45% gravel to 0.8cm; no odor. | SW | Bentonite Seal | |
| 380 | | | | | Same as above (375 ft). | | | New 20' connection. |
| | | | | | Poorly graded SAND (SP); dry; sand lense. | SP | | |
| 385 | | | | | Well graded SAND with Gravel (SW); pinkish gray (7.5YR 6/2); dry; loose to medium dense; 55% sand; 45% gravel; no odor. | SW | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106114

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/20/2011
Date TD Reached: 2/23/2011
Date Completed: 3/1/2011

Ground Elevation AMSL (ft): 5344.8
Y Coordinate: 1473064.09
X Coordinate: 1541796.70

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND with Gravel (SW); pinkish gray (7.5YR 6/2); dry; loose to medium dense; 80% sand; 20% gravel; no odor. | SW | | |
| 395 | | | | | Same as above (390 ft); brown (7.5YR 5/4); moist; finer. | | | |
| 400 | | SB0098 | 1.2 | | Well graded GRAVEL with Sand (GW); light reddish brown (7.5YR 6/3); dry to moist; loose to medium dense; 55% gravel to 3cm; 45% sand; no odor. | GW | | Blow counts (399-400.5'): 10/11/26. New 20' connection @ 1400. |
| 405 | | | | | Well graded SAND (SW); light brown (7.5YR 6/4); dry; loose; 100% sand; no odor. | SW | Bentonite Seal | |
| 410 | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/4); dry; loose; 55% sand; 45% gravel to 0.6cm; angular to subangular; no odor. | | | |
| 415 | | | | | Same as above (410 ft); 70% sand; 30% gravel; finer. | | | |
| 420 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/3); dry; 90% fine sand; 10% coarse sand; no odor. | SP | | |

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# Borehole ID: KAFB-106114

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/20/2011
Date TD Reached: 2/23/2011
Date Completed: 3/1/2011

Ground Elevation AMSL (ft): 5344.8
Y Coordinate: 1473064.09
X Coordinate: 1541796.70

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded GRAVEL with Sand (GW); pinkish gray (7.5YR 7/2); dry; loose; 80% gravel to 2.3cm; 20% fine sand; rounded to subrounded; no odor. | GW | | New 20' connection @ 1440. |
| 425 | | | | | Well graded SAND with Gravel (SW); brown (7.5YR 5/4); moist; loose; 60% sand; 40% gravel to 1.2cm; subrounded to rounded. | SW | Bentonite Seal | |
| 430 | | | | | Poorly graded SAND (SP); pinkish gray (7.5YR 7/2); dry; loose; 100% coarse sand; angular to subangular. | SP | | |
| 435 | | | | | Well graded SAND with Gravel (SW); pinkish gray (7.5YR 7/2); dry; loose; 80% sand; 20% gravel; angular to subangular. | SW | Top of Filter Pack | |
| 440 | | | | | Same as above (435 ft); finer. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | New 10' and 5' connection @ 1520. |
| 445 | | | | | Poorly graded SAND with Gravel (SP); brown (7.5YR 5/4); moist; 70% sand; 30% gravel to 2cm; subangular to subrounded; petroleum odor. | SP | | |
| 450 | X | SB0099 | 2.1 | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; dense; 100% sand; petroleum odor. | | Bottom of | Blow counts (448.5-450'): 12/26/49. |

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# Borehole ID: KAFB-106114

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/20/2011
Date TD Reached: 2/23/2011
Date Completed: 3/1/2011

Ground Elevation AMSL (ft): 5344.8
Y Coordinate: 1473064.09
X Coordinate: 1541796.70

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | SP | Screen | |
| | | | | | | | | Total depth = 451 ft. Reached on 2/23/11. |
| 455 | | | | | | | | Water added during drilling (gallons) = 0 |
| | | | | | | | | Water added during construction (gallons) = 176 |
| 460 | | | | | | | | |
| 465 | | | | | | | | |
| 470 | | | | | | | | |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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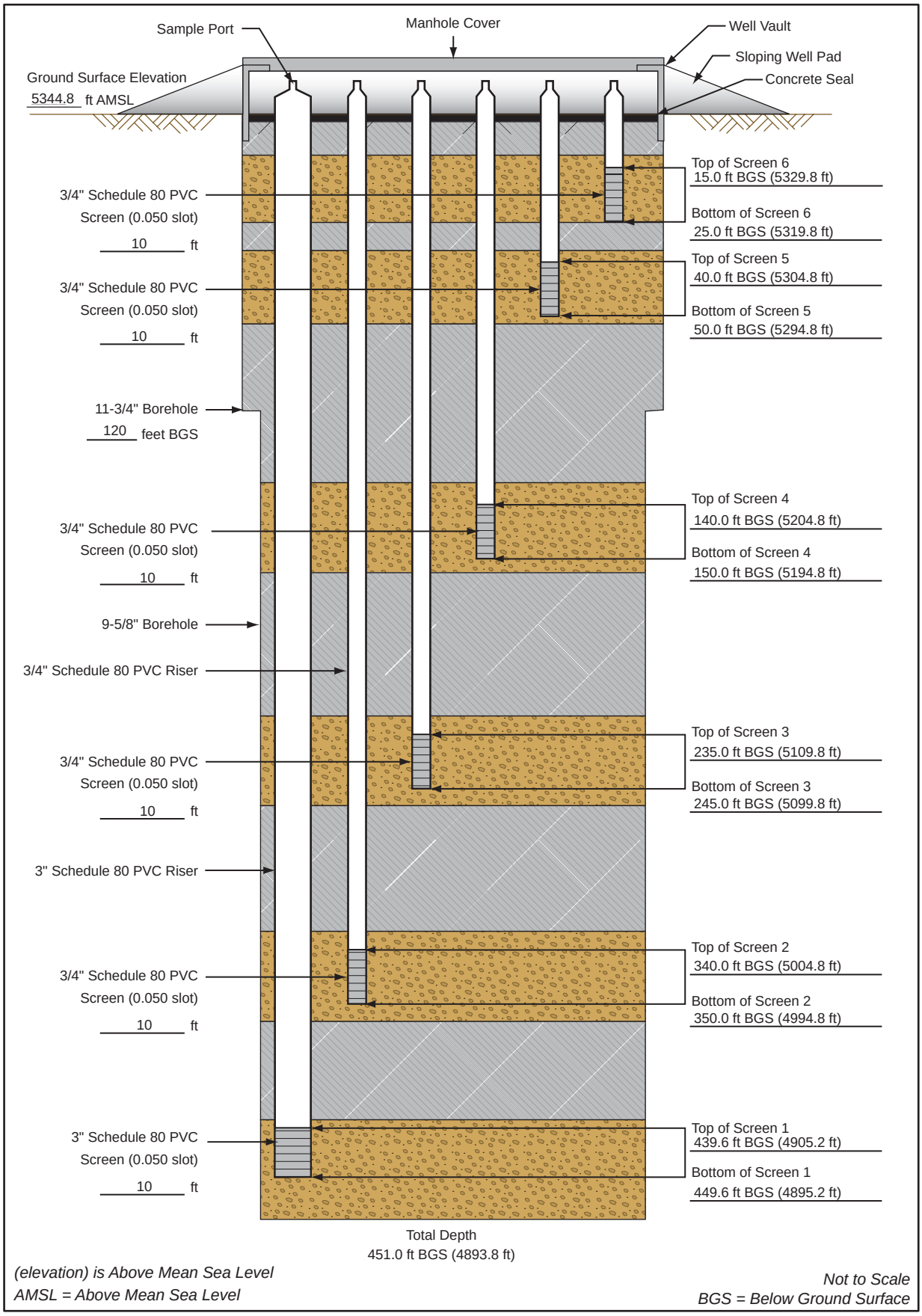
# Nested Soil Vapor Well Completion Diagram for KAFB-106114

Installation Start Date/Time: 2/23/2011 @ 16:10
Installation End Date/Time: 3/1/2011 @ 17:00



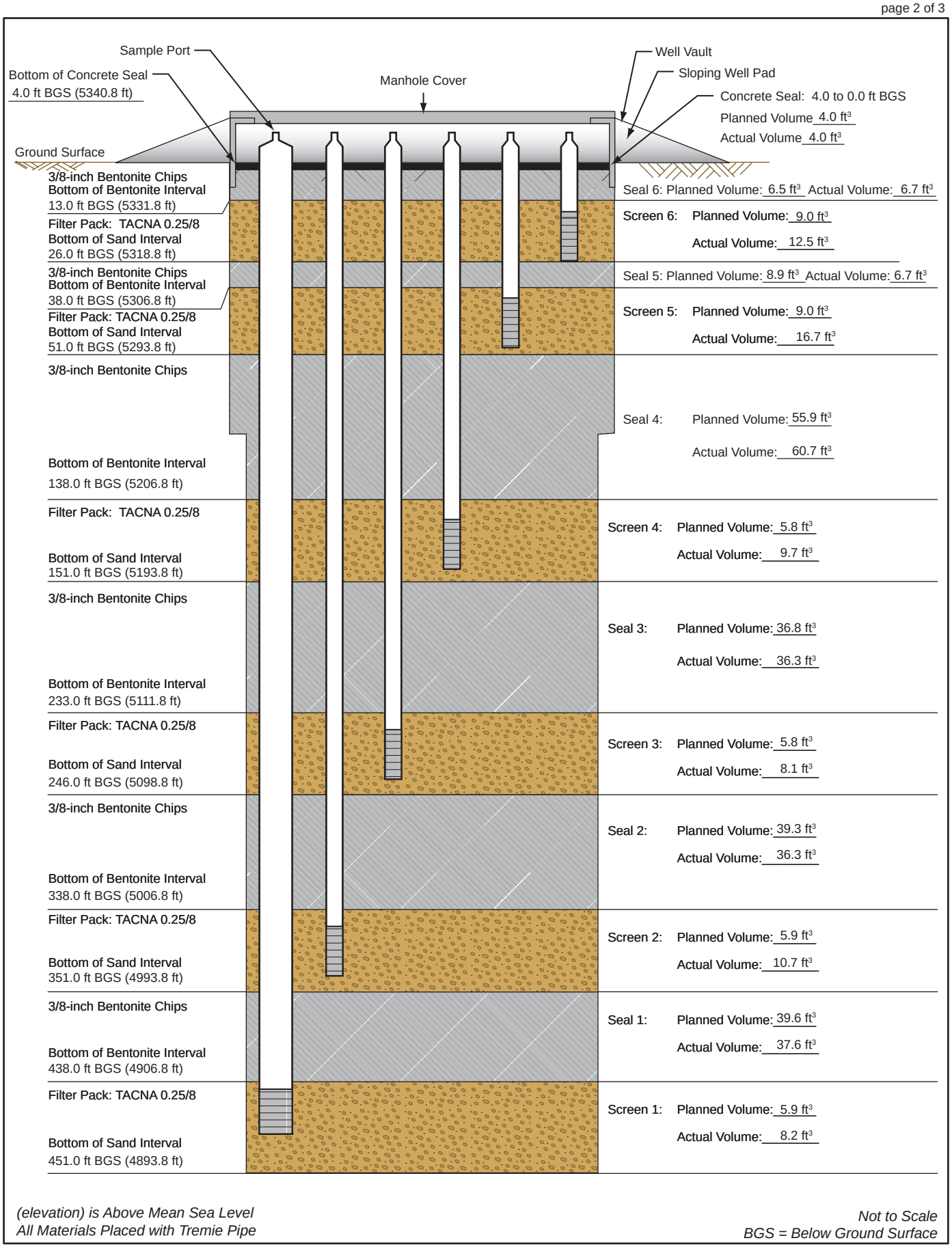



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106114






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

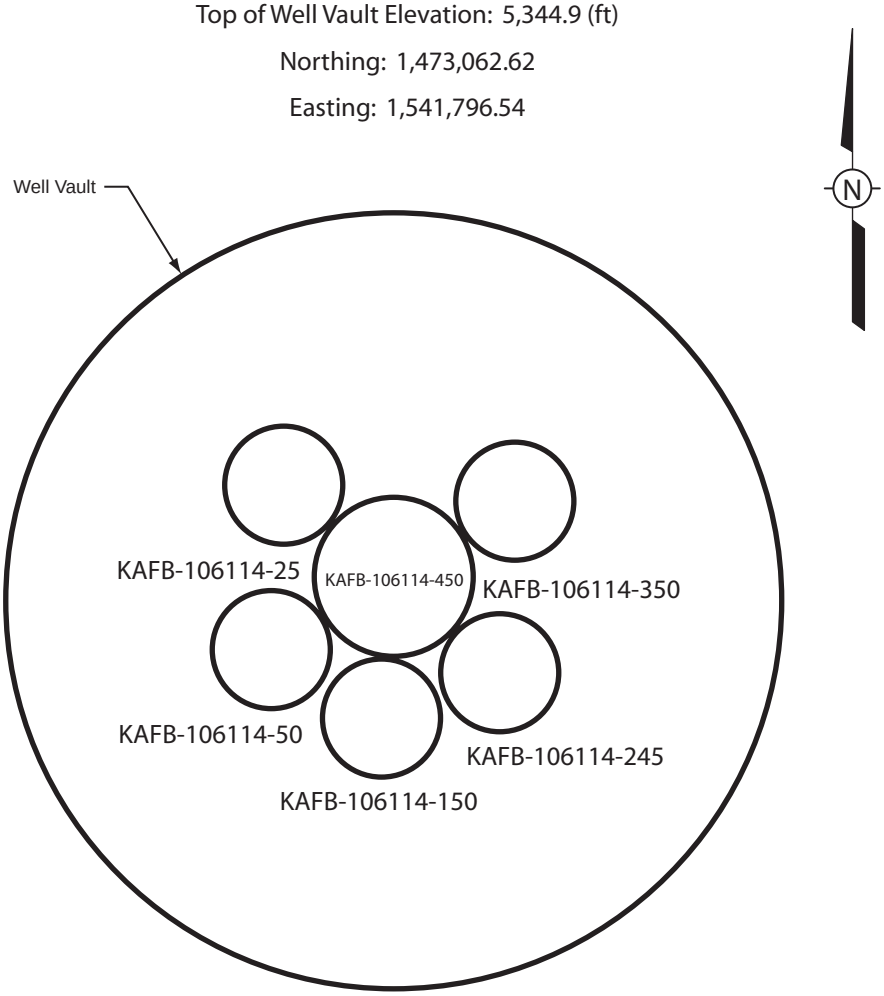
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106114



Top of Well Vault Elevation: 5,344.9 (ft)

Northing: 1,473,062.62

Easting: 1,541,796.54




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106114-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1,473,062.35 | 1,541,796.49 | 5344.6 |
| KAFB-106114-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1,473,062.13 | 1,541,796.24 | 5344.6 |
| KAFB-106114-150 | 3/4 | 150.0 | 140.0 - 150.0 | 1,473,061.84 | 1,541,796.37 | 5344.6 |
| KAFB-106114-245 | 3/4 | 245.0 | 235.0 - 245.0 | 1,473,061.86 | 1,541,796.68 | 5344.6 |
| KAFB-106114-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1,473,062.17 | 1,541,796.71 | 5344.6 |
| KAFB-106114-450 | 3 | 449.6 | 439.6 - 449.6 | 1,473,062.21 | 1,541,796.50 | 5344.6 |

# Borehole ID: KAFB-106115

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/9/2011
Date TD Reached: 2/17/2011
Date Completed: 2/20/2011

Ground Elevation AMSL (ft): 5347.9
Y Coordinate: 1473056.65
X Coordinate: 1542375.40

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero / Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | SILT with Sand (ML); red (2.5YR 5/6); moist; very stiff; 80% silt with minor clay; 20% very fine to fine sand; trace medium to coarse sand; subangular to subrounded; trace fine to coarse gravel to 5cm; subrounded. | | Concrete Seal | Hand augered. |
| 5 | | | | | Same as above (0 ft); no odor. | | Bentonite Seal | Began drilling @ 0744 on 2/9/11. |
| 10 | | SB0100 | 0.0 | | SILT (ML); red (2.5YR 5/6); moist; very stiff to hard; 95% silt with clay; 5% very fine to fine sand; trace coarse sand; subrounded; no odor. Note: gravel lense at 12ft. | ML | | Kelly down @ 0752. Blow counts (9-10.5'): 12/16. Blow counts (10.5-12'): 17/39. New connection @ 0822. Resumed drilling @ 0823. |
| | | SB0101 | 0.0 | | | | Top of Filter Pack | |
| 15 | | | | | SILT with Sand (ML); red (2.5YR 4/8); moist; hard; 55% silt; 30% clay; 15% fine to coarse sand; subangular to subrounded; no odor. Note: clay predominantly as clay nodules. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 20 | | SB0102 | 0.0 | | | | | Kelly down @ 0830. Blow counts (19-20.5'): 19/31. |
| | | | | | Sandy lean CLAY (CL); red (2.5YR 4/8); moist; hard; low to medium plasticity; 55% clay; 15% silt; 30% very fine to fine sand; no odor. | | | New connection @ 0844. Resumed drilling @ 0845. |
| 25 | | | | | Same as above (20 ft); no odor. | CL | Bottom of Screen | |
| | | | | | | | Bentonite Seal | |
| 30 | | SB0103 | 0.0 | | | | | Kelly down @ 0850. Blow counts (29-30.5'): 19/25. |

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# Borehole ID: KAFB-106115

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/9/2011
Date TD Reached: 2/17/2011
Date Completed: 2/20/2011

Ground Elevation AMSL (ft): 5347.9
Y Coordinate: 1473056.65
X Coordinate: 1542375.40

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero / Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); red (2.5YR 5/6); moist; hard; 80% silt; 20% clay; no odor. | ML | | New connection @ 0905. Resumed drilling @ 0906. |
| 35 | | | | | Same as above (30 ft); 85% silt; 15% clay; no odor. | | Bentonite Seal | |
| 40 | | SB0104 | 0.0 | | Sandy lean CLAY (CL); red (2.5YR 5/6); moist; hard; low plasticity; 70% clay with minor silt; 30% fine sand; no odor. | CL | Top of Filter Pack<br>Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 0914. Blow counts (39-40.5'): 36/41. Blow counts (40.5-42'): 50/Not Recorded. Blow counts (42-43.5'): 36/64. Blow counts (43.5-45'): 17/50. New connection @ 0950. Resumed drilling @ 0951. |
| | | SB0104 | | | | | | |
| | | SB0104 | | | | | | |
| 45 | | SB0104 | | | Same as above (40 ft); no odor. | | | |
| 50 | | SB0105 | 0.0 | | Same as above (40 ft); no odor. | | Bottom of Screen | Kelly down @ 1003. Blow counts (49-50.5'): 30/46. New connection @ 1016. Resumed drilling @ 1017. |
| 55 | | | | | Same as above (40 ft); 65% clay with silt; 35% very fine to fine sand; no odor. | | Bentonite Seal | |
| 60 | | | | | | | | Kelly down @ 1027. |

# Borehole ID: KAFB-106115

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/9/2011
Date TD Reached: 2/17/2011
Date Completed: 2/20/2011

Ground Elevation AMSL (ft): 5347.9
Y Coordinate: 1473056.65
X Coordinate: 1542375.40

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero / Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT (ML); red (2.5YR 4/8); moist; hard; 70% silt; 30% clay; trace very fine to fine sand; no odor. | | | New connection @ 1046. Resumed drilling @ 1054. |
| 65 | | | | | Sandy SILT (ML); red (2.5YR 4/8); moist; hard; 70% silt with minor clay; 30% fine to coarse sand; subangular to subrounded; trace fine gravel to 1.5cm; no odor. | | | |
| 70 | | | | | SILT (ML); red (2.5YR 4/8); moist; hard; 90% silt with minor clay; 10% fine to coarse sand; subangular; no odor. | ML | | |
| 75 | | | | | SILT (ML); red (2.5YR 4/8); moist; stiff to very stiff; 95% silt with minor clay; 5% fine to medium sand; trace coarse sand; angular to subangular; no odor. | | Bentonite Seal | Casing advanced without hammer last ~5ft. |
| | | | | | | | | Kelly down @ 1058. |
| 80 | | | | | Lean CLAY (CL); red (2.5YR 4/8); moist; very stiff to hard; low to medium plasticity; 90% clay with silt; 10% fine sand; trace medium to coarse sand; subangular; no odor. | | | New connection @ 1112. Resumed drilling @ 1114. |
| 85 | | | | | Same as above (80 ft); 95% clay with minor silt; 5% fine sand; no odor. | CL | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106115

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/9/2011
Date TD Reached: 2/17/2011
Date Completed: 2/20/2011

Ground Elevation AMSL (ft): 5347.9
Y Coordinate: 1473056.65
X Coordinate: 1542375.40

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero / Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Lean CLAY (CL); red (2.5YR 5/6); moist; very stiff; low plasticity; 70% clay; 30% silt; trace very fine to fine sand; no odor. | CL | | No hammer, entire joint. |
| 95 | | | | | SILT (ML); reddish brown (2.5YR 5/4); moist; very stiff to hard; 85% silt; 15% clay; trace very fine to fine sand; no odor. | ML | | Kelly down @ 1118. Blow counts (99-100.5'): 36/50. |
| 100 | | SB0106 | 0.0 | | Sandy SILT (ML); reddish brown (2.5YR 5/4); moist; stiff to very stiff; 70% silt with trace clay; 30% fine sand; no odor. | | | New connection @ 1211. Resumed drilling @ 1212. |
| 105 | | | | | Silty SAND (SM); reddish brown (5YR 5/4); moist; loose to medium dense; 70% fine sand; trace medium to coarse sand; subangular; 30% silt with trace clay; no odor. | SM | Bentonite Seal | No hammer, entire joint. |
| 110 | | | | | Same as above (105 ft); 85% fine to coarse sand; subangular to subrounded; 15% silt with trace clay; no odor. | | | |
| 115 | | | | | Well graded SAND with Silt and Gravel (SW-SM); reddish brown (5YR 5/4); moist; loose to medium dense; 75% fine to coarse sand; subangular to subrounded; 15% fine to coarse gravel to 3cm; subrounded; 10% silt with trace clay; no odor. | SW-SM | | Kelly down @ 1215. TD 11-3/4" casing at 120'. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106115

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/9/2011
Date TD Reached: 2/17/2011
Date Completed: 2/20/2011

Ground Elevation AMSL (ft): 5347.9
Y Coordinate: 1473056.65
X Coordinate: 1542375.40

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero / Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Lean CLAY (CL); red (2.5YR 4/6); moist; hard; low to medium plasticity; 65% clay; 35% silt; no odor. | | | New connection @ 1541. Resumed drilling @ 1544. |
| 125 | | | | | Same as above (120 ft). | CL | | |
| 130 | | | | | SILT (ML); red (2.5YR 5/6); moist; very stiff to hard; 70% silt; 30% clay; no odor. | ML | Bentonite Seal | |
| 135 | | | | | Lean CLAY (CL); red (2.5YR 5/6); moist; hard; low to medium plasticity; 70% clay; 30% silt; no odor. | CL | | Kelly down @ 1557. |
| 140 | | | | | Same as above (135 ft); no odor. | | | New connection @ 1650. Resumed drilling @ 0749 on 2/10/11. |
| 145 | | | | | Silty SAND (SM); pale red (2.5YR 7/2); moist; medium dense; 85% fine sand; 15% silt; no odor. | SM | Top of Filter Pack<br>Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Top of Santa Fe Group. |
| 150 | | SB0107 | 0.0 | | | | | Kelly down @ 0813. Blow counts (149-150.5'): 46/50. |

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# Borehole ID: KAFB-106115

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/9/2011
Date TD Reached: 2/17/2011
Date Completed: 2/20/2011

Ground Elevation AMSL (ft): 5347.9
Y Coordinate: 1473056.65
X Coordinate: 1542375.40

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero / Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Silty SAND (SM); pale red (2.5YR 7/2); dry to moist; very dense (based on blow counts); 80% very fine to fine sand; 20% silt; no odor. | SM | | Blow counts (100.5-102'): 26/49. Blow counts (102-103.5'): 36/50. New connection @ 0935. Resumed drilling @ 0938. Stopped drilling @ 0944, due to plugged discharge. Resumed drilling @ 1015. |
| | | SB0107-MS | 0.0 | | | | | |
| | | SB0107-MSD | 0.0 | | | | | |
| 155 | | | | | Sandy SILT (ML); red (2.5YR 5/6); moist; very stiff to hard; 70% silt with minor clay; 30% very fine to fine sand; trace medium to coarse sand; subrounded; no odor. | ML | Bottom of Screen | Kelly down @ 1022. |
| 160 | | | | | Poorly graded SAND (SP); pale red (2.5YR 7/2); dry to moist; very dense; 95% very fine to fine sand; 5% silt; no odor. | SP | | New connection @ 1033. Resumed drilling @ 1034. |
| 165 | | | | | Well graded SAND (SW); pale red (2.5YR 7/2); dry to moist; very dense; 90% very fine to coarse sand; subangular to subrounded; 10% fine to coarse gravel to 3cm; subrounded; no odor. | SW | Bentonite Seal | |
| 170 | | | | | Same as above (165 ft); 100% sand; trace fine gravel to 1.5cm; subrounded; no odor. | | | |
| 175 | | | | | Same as above (165 ft). | | | |
| 180 | | | | | Poorly graded SAND (SP); pale red (2.5YR 7/2); dry to moist; very dense; 95% fine sand; 5% silt; no odor. | SP | | Kelly down @ 1048. |

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**Project Number:** 140705

Date Started: 2/9/2011
Date TD Reached: 2/17/2011
Date Completed: 2/20/2011

Ground Elevation AMSL (ft): 5347.9
Y Coordinate: 1473056.65
X Coordinate: 1542375.40

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero / Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Poorly graded SAND (SP); pale red (2.5YR 7/2); dry to moist; very dense; 95% fine sand; 5% silt; no odor. | | | New connection @ 1057. Resumed drilling @ 1058. |
| 185 | | | | | Same as above (180 ft); no odor. | SP | | Kelly down @ 1104. |
| 190 | | | | | Poorly graded SAND (SP); pale red (2.5YR 7/2); dry to moist; very dense; 95% very fine to medium sand; subangular to subrounded; 5% silt; no odor; pumice clasts/fragments. | | | New connection @ 1138. Resumed drilling @ 1138. |
| 195 | | | | | Poorly graded SAND with Silt (SP-SM); light reddish brown (2.5YR 7/3); dry to moist; very dense; 90% fine to medium sand; subangular to subrounded; 10% silt with trace clay; no odor. Note: large, rounded, vitric pumice clasts with quartz phenocrysts; altered and unaltered. | SP-SM | Bentonite Seal | Kelly down @ 1145. Blow counts (199-200.5'): 37/50. |
| 200 | | SB0108 | 0.0 | | Poorly graded SAND with Silt (SP-SM); pale red (2.5YR 7/2); dry to moist; very dense; 90% fine to medium sand; subrounded; 10% silt with clay; no odor. Note: 3-4in of lean clay in split spoon; light brown (7.5YR 6/3); high plasticity; moist; black carbonaceous material. | CL | | New connection @ 1205. Resumed drilling @ 1206. |
| 205 | | | | | Lean CLAY (CL); light brown (7.5YR 6/3); moist; hard; high plasticity; 100% clay; black, carbonaceous dendritic material; no odor. | SP-SM | | |
| 210 | | | | | Poorly graded SAND with Silt (SP-SM); light brown (7.5YR 6/3); moist; very dense; 90% very fine to fine sand; 10% silt with clay; no odor. | | | |

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**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/9/2011
Date TD Reached: 2/17/2011
Date Completed: 2/20/2011

Ground Elevation AMSL (ft): 5347.9
Y Coordinate: 1473056.65
X Coordinate: 1542375.40

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero / Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded SAND with Silt (SP-SM); light brown (7.5YR 6/3); dry to moist; very dense; 90% fine sand; 10% silt with minor clay; no odor. Note: pumice present with no alteration/oxidation. | SP-SM | | |
| 215 | | | | | Same as above (210 ft); pale red (2.5YR 7/2); 90% fine to medium sand; trace coarse sand; subangular to subrounded; 10% silt with minor clay; no odor. | | | Kelly down @ 1225. |
| 220 | | | | | Poorly graded SAND (SP); pale red (2.5YR 7/2); dry to moist; very dense; 95% fine to medium sand; trace coarse sand; subrounded to subangular; 5% silt; no odor. Note: very small pumice clasts. | SP | Bentonite Seal | New connection @ 1250. Resumed drilling @ 1251. |
| 225 | | | | | Well graded SAND (SW); light reddish gray (2.5YR 7/1); dry; very dense; 100% very fine to coarse sand; subangular; trace silt; no odor. | SW | | |
| 230 | | | | | Poorly graded SAND (SP); light reddish gray (2.5YR 7/1); dry; very dense; 95% fine to medium sand; subrounded; 5% silt; no odor. Grades into 100% medium to coarse sand; no odor. | SP | | |
| 235 | | | | | Silty SAND with Gravel (SM); pinkish gray (5YR 6/2); moist; very dense to hard; 70% very fine to fine sand; trace medium sand; subangular to subrounded; 15% coarse gravel to 3cm; subrounded; trace cobbles to 5cm; 15% silt with minor clay; no odor. | SM | Top of Filter Pack | Silt and minor clay at 233' likely represent a perched layer - sample has high moisture content, but is not "wet". |
| 240 | | | | | | | Top of 3/4" | Kelly down @ 1330. |

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**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/9/2011
Date TD Reached: 2/17/2011
Date Completed: 2/20/2011

Ground Elevation AMSL (ft): 5347.9
Y Coordinate: 1473056.65
X Coordinate: 1542375.40

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero / Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND (SP); pale red (2.5YR 7/2); dry to moist; very dense; 95% very fine to medium sand; trace coarse sand; subangular to subrounded; 5% silt; no odor. | | Schedule 80 PVC 0.050 Slot Screen | New connection @ 0909. Resumed drilling @ 0910. Experienced problems with casing, hammered below 242 ft. |
| 245 | | | | | Poorly graded SAND (SP); pinkish gray (5YR 7/2); moist; very dense; 100% fine to medium sand; subrounded to rounded; no odor. Note: sample is primarily volcanic ash with minor lithic fragments; altered. | | | |
| 250 | | SB0109 | 1.0 | | Poorly graded SAND (SP); pale red (2.5YR 7/2); dry to moist; very dense; 95% very fine to medium sand; trace coarse sand; subangular to subrounded; 5% silt; no odor. | SP | Bottom of Screen | Kelly down @ 1007. Blow counts (249-250.5'): 48/50. |
| 255 | | | | | Same as above (250 ft); finer than above; no odor. | | | Kelly down @ 1056. |
| 260 | | | | | Lean CLAY with Sand (CL); pinkish gray (5YR 6/2); moist; hard; low plasticity; 85% clay with minor silt; 15% fine sand; no odor. | CL | Bentonite Seal | New connection @ 1105. Resumed drilling @ 1106. |
| 265 | | | | | Sandy SILT (ML); pinkish gray (5YR 6/2); moist; very hard to hard; 70% silt with trace clay; 30% very fine to fine sand; no odor. | ML | | |
| 270 | | | | | | | | |

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**Project Location:** KAFB, Albuquerque, NM
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Date Started: 2/9/2011
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Ground Elevation AMSL (ft): 5347.9
Y Coordinate: 1473056.65
X Coordinate: 1542375.40

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero / Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Sandy SILT (ML); pinkish gray (5YR 6/2); moist; very hard to hard; 70% silt with minor clay; 30% very fine to fine sand; no odor. | ML | | Stopped advancing to empty hopper @ 1132. Resumed drilling @1135. Added water to cyclone for dust supression. |
| 275 | | | | | Silty SAND (SM); pinkish gray (5YR 6/2); moist; very dense to dense; 60% very fine to fine sand; 40% silt with trace clay; no odor. | SM | | Kelly down @ 1159. |
| 280 | | | | | Poorly graded SAND (SP); light reddish gray (2.5YR 7/1); dry; very dense; 100% very fine to fine sand; some medium sand; subangular to subrounded; no odor. | SP | | New connection @ 1207. Resumed drilling @ 1208. |
| 285 | | | | | Well graded GRAVEL (GW); pinkish gray (5YR 7/2); dry; loose; 95% coarse gravel; subangular to angular; 5% clay; no odor. | GW | Bentonite Seal | Hammer driving slowly. Resumed drilling @ 1640. A. Willmore (geologist) started logging. |
| 290 | | | | | CLAY (CL); reddish brown (5YR 5/4); dry; soft; medium plasticity; 80% clay; 20% silt; no odor. | CL | | |
| 295 | | | | | Same as above (290 ft); pinkish gray (5YR 6/2). | | | |
| 300 | X | SB0110 | 0.8 | | | | | Blow counts (299-300.5'): |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/25/11 17:38 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

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Y Coordinate: 1473056.65
X Coordinate: 1542375.40

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero / Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | SB0110 | | | Well graded GRAVEL (GW); pinkish gray (5YR 6/2); dry; loose; 65% coarse gravel; angular to subrounded; 35% clay; no odor. | GW | | 14/36/50. Blow counts (300.5-302'): 16/48/50. New connection @ 1300. Began tripping out. Resumed drilling @ 1305. |
| 305 | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/3); dry; loose; 75% sand; 25% coarse gravel; subangular to subrounded; no odor. | SW | | |
| 310 | | | | | Poorly graded SAND (SP); very pale brown (10YR 7/3); dry; loose; 95% sand; 5% fine gravel; no odor. | SP | | |
| 315 | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/3); dry; loose; 60% sand; 40% coarse gravel; subangular to subrounded. Note: coarser gravel than 305 ft. | | Bentonite Seal | |
| 320 | | | | | Same as above (315 ft); finer gravel. | SW | | New connection @ 1355. |
| 325 | | | | | Same as above (315 ft). | | | New connection @ 1415. |
| 330 | | | | | | | | |

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**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/9/2011
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Date Completed: 2/20/2011

Ground Elevation AMSL (ft): 5347.9
Y Coordinate: 1473056.65
X Coordinate: 1542375.40

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero / Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/3); dry; loose; 55% sand; 45% coarse gravel; subangular to subrounded. | | Bentonite Seal | |
| 335 | | | | | Same as above (330 ft); 75% sand; 25% gravel. | | Top of Filter Pack | New connection @ 1445. |
| 340 | | | | | Same as above (330 ft) | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 345 | | | | | Same as above (330 ft); 55% sand; 45% gravel. | | | Began tripping out to attach spilt spoon sampler @ 1510. |
| 350 | | SB0111 | 0.8 | | | | Bottom of Screen | Blow counts (349-350.5'): 14/39/50. New 10' connection @ 1615. |
| | | | | | Well graded GRAVEL with Sand (GW); reddish gray (5YR 5/2); dry; loose; 65% gravel; 35% coarse sand; subangular to to subrounded; no odor. | GW | | |
| 355 | | | | | | | Bentonite Seal | |
| | | | | | Poorly graded SAND with Silt (SP-SM); light reddish brown (5YR 6/4); moist; medium dense; 90% fine sand; 10% silt; no odor. | SP-SM | | |
| 360 | | | | | | | | |

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X Coordinate: 1542375.40

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero / Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Poorly graded SAND with Silt (SP-SM); light reddish brown (5YR 6/4); moist; medium dense; 90% fine sand; 10% silt; no odor. | SP-SM | | New 20' connection @ 1640. |
| 365 | | | | | Well graded SAND (SW); reddish gray (5YR 5/2); moist; medium dense to loose; 95% coarse sand; subangular to subrounded; 5% silt; no odor. | SW | | |
| 370 | | | | | Well graded GRAVEL (GW); reddish gray (5YR 5/2); dry; loose; 90% gravel; 10% coarse sand; angular to subrounded; no odor. | GW | | |
| 375 | | | | | Well graded SAND with Gravel (SW); reddish gray (5YR 5/2); dry; loose; 60% sand; 40% coarse gravel; angular to subrounded; no odor. | | Bentonite Seal | |
| 380 | | | | | Same as above (375 ft); finer gravel. | SW | | New connection @ 0755 on 2/17/11. |
| 385 | | | | | Well graded SAND (SW); reddish gray (5YR 5/2); dry; loose; 90% sand; 10% gravel; angular to subrounded; no odor. | | | |
| 390 | | | | | | | | |

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Ground Elevation AMSL (ft): 5347.9
Y Coordinate: 1473056.65
X Coordinate: 1542375.40

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero / Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND with Gravel (SW); reddish gray (5YR 5/2); dry; loose; 60% sand; 40% gravel; angular to subrounded; no odor. | | | |
| 395 | | | | | Same as above (390 ft). | SW | | |
| 400 | | SB0112 | 0.3 | | | | | Began tripping out to collect spilt spoon samples @ 0835. Blow counts (399-400.5'): 11/16/12. Blow counts (400.5-402'): 6/13/15. Began tripping pipe back in @ 0925. |
| | | SB0113 | 0.3 | | Well graded GRAVEL with Sand (GW); reddish gray (5YR 5/2); dry; loose; 70% gravel; 30% coarse sand; subangular to rounded; no odor. | GW | | |
| 405 | | | | | Well graded SAND (SW); pinkish gray (5YR 6/2); moist; loose; 90% sand; 10% coarse gravel; angular to subrounded; no odor. | | Bentonite Seal | |
| 410 | | | | | Same as above (405 ft). | SW | | |
| 415 | | | | | Well graded SAND with Gravel (SW); pinkish gray (5YR 6/2); moist; loose; 75% sand; 25% coarse gravel; subangular to subrounded; no odor. | | | |
| 420 | | | | | | | | |

# Borehole ID: KAFB-106115

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/9/2011
Date TD Reached: 2/17/2011
Date Completed: 2/20/2011

Ground Elevation AMSL (ft): 5347.9
Y Coordinate: 1473056.65
X Coordinate: 1542375.40

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero / Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND with Gravel (SW); pinkish gray (5YR 6/2); moist; loose; 75% sand; 25% coarse gravel; subangular to subrounded; no odor. Note: gravel finer than 415'. | | | New connection @ 1120. |
| 425 | | | | | Same as above (420 ft); coarse sand; less gravel. | SW | Bentonite Seal | |
| 430 | | | | | Same as above (420 ft); pinkish gray (7.5YR 7/2); finer sand; less graded; coarser gravel; subangular to subrounded. | | | Hammer stuck @ 1148. Began hammering @ 1300. |
| 435 | | | | | Poorly graded SAND (SP); pinkish gray (7.5YR 7/2); moist; loose; 95% fine sand; subangular to subrounded; 5% silt; no odor. | SP | Top of Filter Pack | |
| 440 | | | | | Well graded SAND with Gravel (SW); pinkish gray (5YR 6/2); dry; loose; 60% sand; 40% coarse gravel; subangular to subrounded; no odor. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Hammer locked @ 1320. New 10' connection @ 1320. Resumed drilling @ 1340. |
| 445 | | | | | Same as above (440 ft); finer sand; less gravel. | SW | | |
| 450 | X | SB0114 | 0.6 | | | | Bottom of | Blow counts (448.5-450'):12/21/33. |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/25/11 17:38 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106115

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/9/2011
Date TD Reached: 2/17/2011
Date Completed: 2/20/2011

Ground Elevation AMSL (ft): 5347.9
Y Coordinate: 1473056.65
X Coordinate: 1542375.40

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero / Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | No description recorded. | | Screen | |
| 455 | | | | | | | | Total Depth = 455 ft. Reached @ 1510 on 2/17/11. |
| 460 | | | | | | | | Water added during drilling (gallons) = 0 |
| 465 | | | | | | | | Water added during construction (gallons) = Not Recorded |
| 470 | | | | | | | | Kelly down: TD the joint and ready to make new connection |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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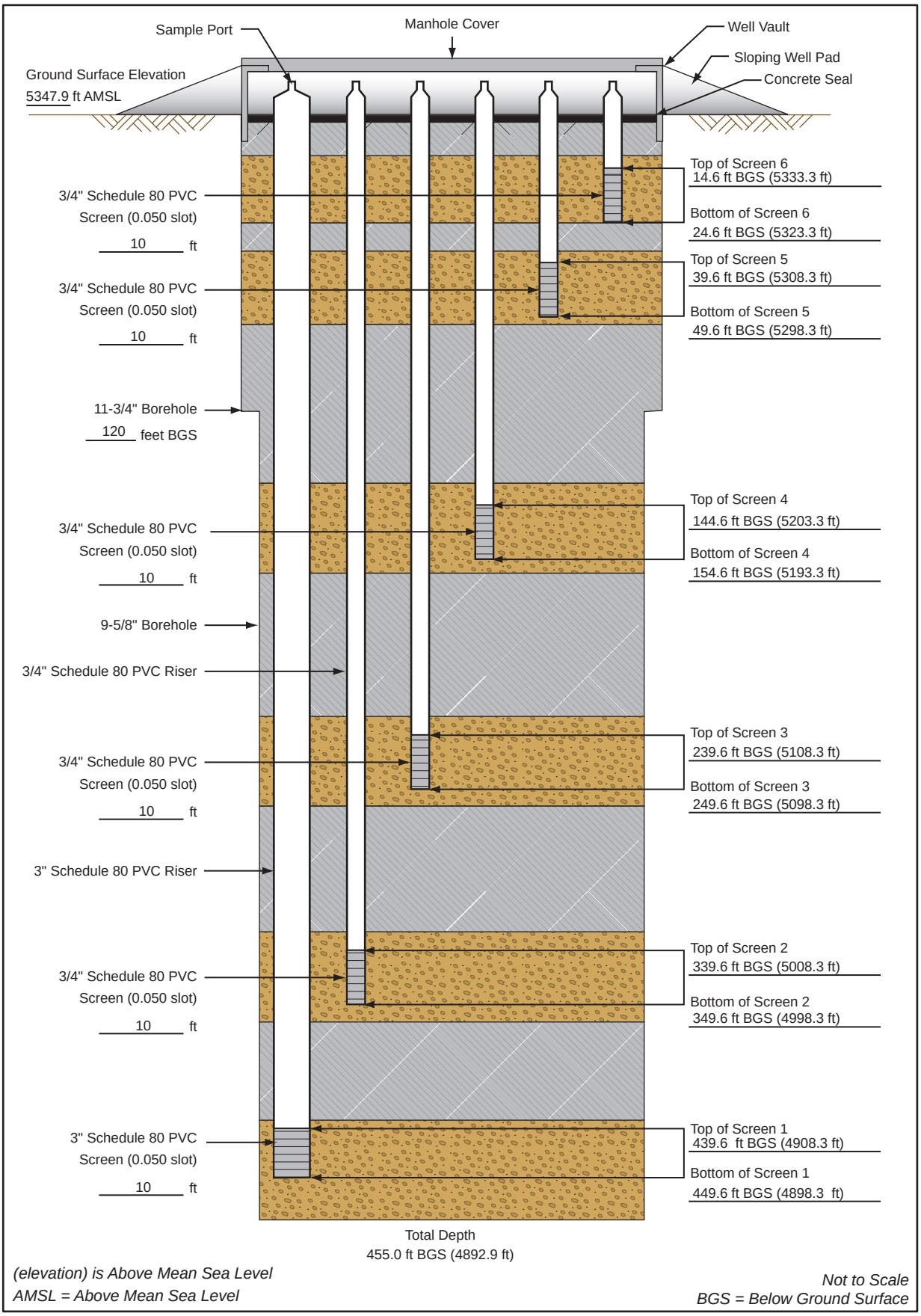
# Nested Soil Vapor Well Completion Diagram for KAFB-106115

Installation Start Date/Time: 2/18/2011 @ 08:15
Installation End Date/Time: 2/20/2011 @ 9:20





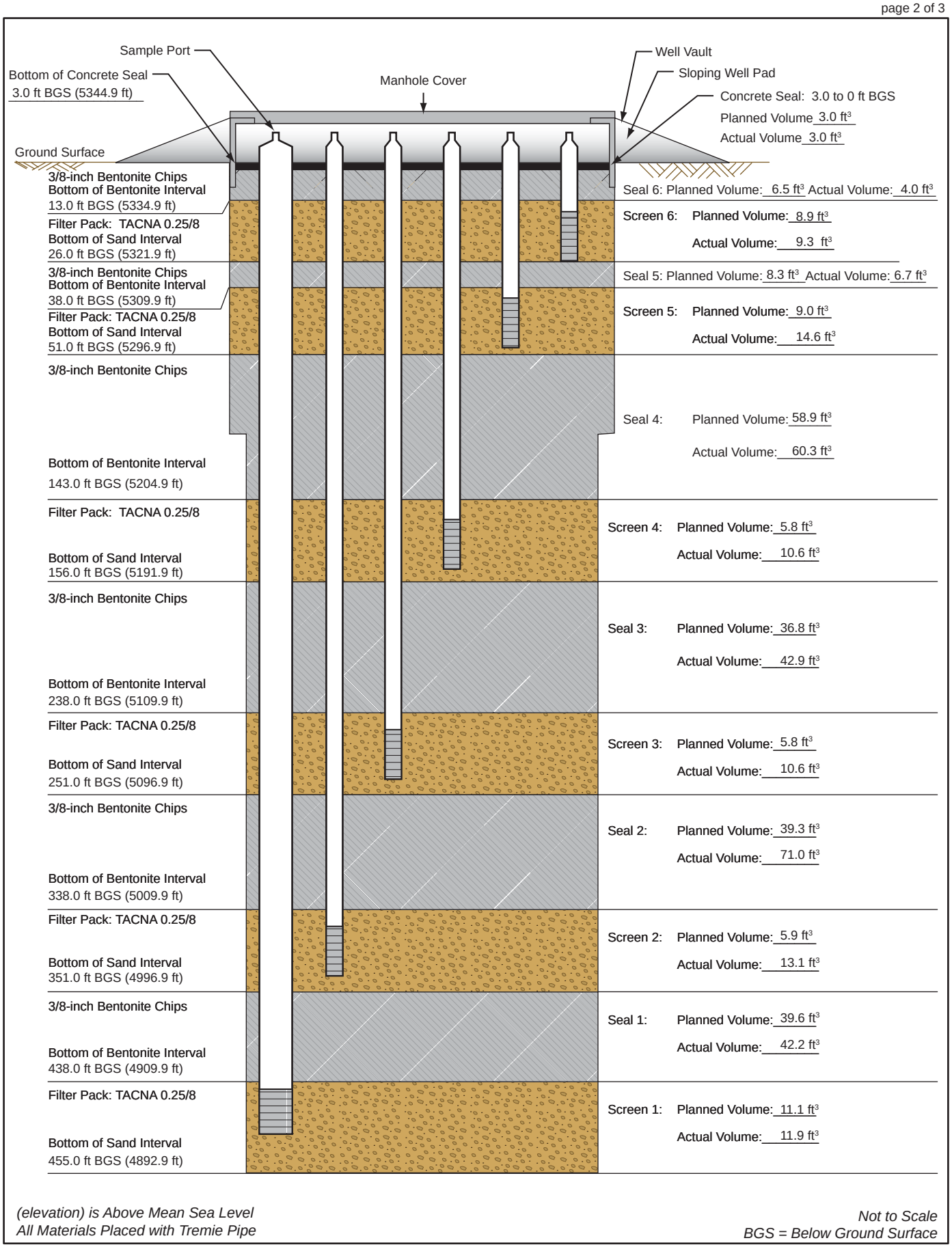

*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

140705_CA010020_SV_KAFB.106115 (a)

# Nested Soil Vapor Well Completion Diagram for KAFB-106115






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

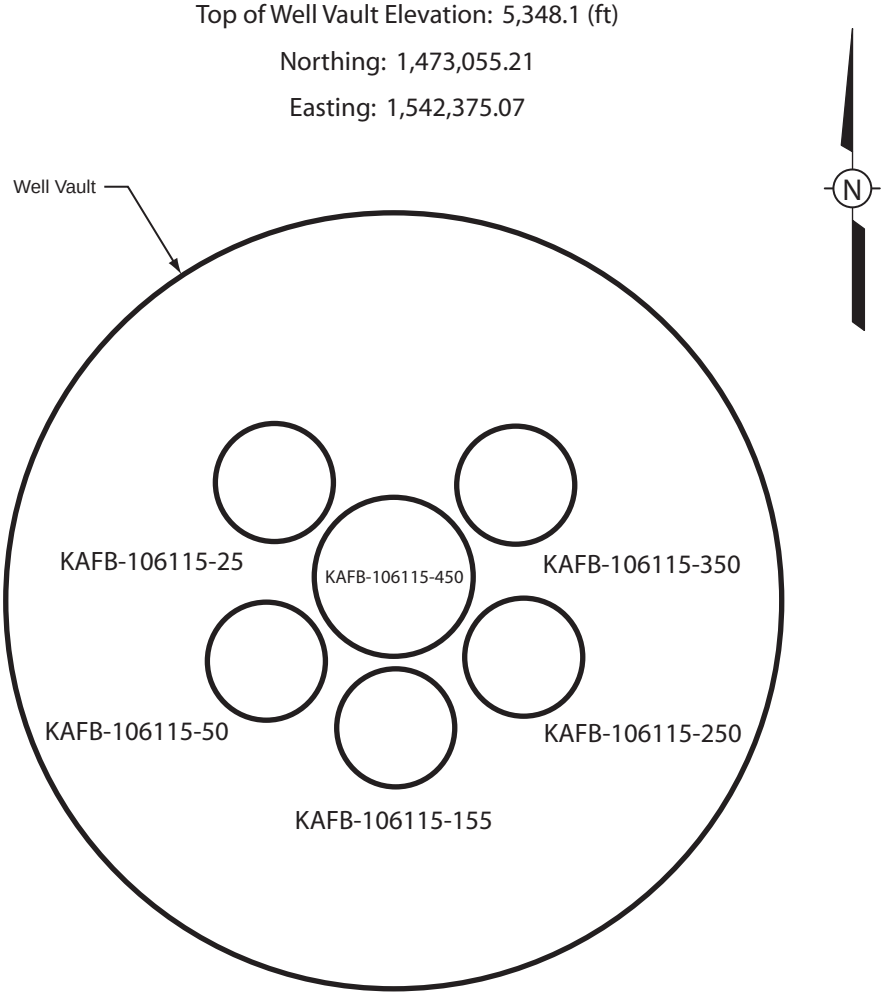
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106115



Top of Well Vault Elevation: 5,348.1 (ft)

Northing: 1,473,055.21

Easting: 1,542,375.07




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106115-25 | 3/4 | 24.6 | 14.6 - 24.6 | 1,473,054.86 | 1,542,375.31 | 5347.6 |
| KAFB-106115-50 | 3/4 | 49.6 | 39.6 - 49.6 | 1,473,054.62 | 1,542,375.13 | 5347.6 |
| KAFB-106115-155 | 3/4 | 154.6 | 144.6 - 154.6 | 1,473,054.66 | 1,542,374.86 | 5347.6 |
| KAFB-106115-250 | 3/4 | 249.6 | 239.6 - 249.6 | 1,473,054.94 | 1,542,374.83 | 5347.7 |
| KAFB-106115-350 | 3/4 | 349.6 | 339.6 - 349.6 | 1,473,055.00 | 1,542,375.10 | 5347.7 |
| KAFB-106115-450 | 3 | 449.6 | 439.6 - 449.6 | 1,473,054.93 | 1,542,375.05 | 5347.7 |

# Borehole ID: KAFB-106116

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/4/2011
Date TD Reached: 3/6/2011
Date Completed: 3/10/2011

Ground Elevation AMSL (ft): 5346.2
Y Coordinate: 1473298.77
X Coordinate: 1541894.10

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Silty SAND (SM); light reddish brown (2.5YR 6/3); dry; medium dense to dense; 75% very fine to coarse sand; subangular to subrounded; 25% silt with minor clay; no odor. | SM | Concrete Seal | Hand augered. |
| 5 | | | | | Same as above (0 ft); no odor. | | Bentonite Seal | Spud @ 1208 on 3/4/11. |
| | X | SB0115 | 0.0 | | | | Top of Filter Pack | Blow counts (7-8.5'): 12/16. |
| 10 | | | | | Clayey SAND (SC); reddish brown (2.5YR 5/3); moist; medium dense; 75% fine to coarse sand; subangular to subrounded; 25% clay with minor silt; no odor. | SC | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 15 | | | | | Lean CLAY (CL); reddish brown (2.5YR 4/4); moist; very stiff; medium plasticity; 95% clay; trace silt; 5% very fine to fine sand; no odor. | CL | | |
| | X | SB0116 SB0116-MS | 0.0 | | | | | Blow counts (17-18.5'): 10/14. Blow counts (18.5-20'): 17/20. |
| 20 | X | SB0116-MSD | 0.0 | | | | Bottom of Screen | |
| | | | | | Sandy lean CLAY (CL); reddish brown (2.5YR 4/4); dry to moist; hard; low plasticity; 70% clay with minor silt; 30% very fine to fine sand; trace medium to coarse sand; subangular to subrounded; no odor. | | | Kelly down @ 1309. New connection @ 1322. Resumed drilling @ 1323. |
| 25 | | | | | SILT (ML); red (2.5YR 5/6); dry to moist; stiff to very stiff; 95% silt; 5% very fine to medium sand; subangular; no odor. | ML | Bentonite Seal | |
| | X | SB0117 | 0.0 | | | | | Blow counts (27-28.5'): 12/19. |
| 30 | | | | | | | | |

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# Borehole ID: KAFB-106116

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/4/2011
Date TD Reached: 3/6/2011
Date Completed: 3/10/2011

Ground Elevation AMSL (ft): 5346.2
Y Coordinate: 1473298.77
X Coordinate: 1541894.10

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); red (2.5YR 5/6); dry to moist; stiff; 90% silt; 10% clay; no odor. | ML | Bentonite Seal | Kelly down @ 1336. New connection @ 1401. Resumed drilling @ 1403. |
| 35 | | | | | Same as above (30 ft); 100% silt; no odor. | | | |
| | | SB0118 | 0.0 | | | | Top of Filter Pack | Blow counts (37-38.5'): 8/11. |
| 40 | | | | | SILT with Sand (ML); light reddish brown (2.5YR 6/3); dry; very stiff; 75% silt; 5% clay nodules; 20% very fine to coarse sand; subangular; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1417. New connection @ 1434. Resumed drilling @ 1435. |
| 45 | | | | | Same as above (40 ft); no odor. | | | |
| | | SB0119 SB0120 | 0.0 | | | | | Blow counts (47-48.5'): 15/21. |
| 50 | | | | | Same as above (40 ft); no odor. | | Bottom of Screen | Kelly down @ 1442. New connection @ 1513. Resumed drilling @ 1513. Stopped drilling @ 1515 due to clogged discharge. Resumed advancing @ 1544, no cuttings returned. Stopped advancing @ 1548, still clogged. Resumed drilling @ 1623, discharge cleared. |
| 55 | | | | | SILT with Sand (ML); light reddish brown (2.5YR 6/3); dry; very stiff; 80% silt; 20% fine to coarse sand; subangular; no odor. | | Bentonite Seal | |
| 60 | | | | | Well graded SAND with Silt (SW-SM); light reddish brown (2.5YR 6/3); dry; dense; 90% very fine to coarse sand; | SW-SM | | |

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# Borehole ID: KAFB-106116

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/4/2011
Date TD Reached: 3/6/2011
Date Completed: 3/10/2011

Ground Elevation AMSL (ft): 5346.2
Y Coordinate: 1473298.77
X Coordinate: 1541894.10

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | subangular to angular; 10% silt; no odor. SILT (ML); red (2.5YR 4/6); dry to moist; very stiff; 100% silt; no odor. | | | Kelly down @ 1642. New connection @ 1652. Resumed drilling @ 1653. |
| 65 | | | | | SILT with Sand (ML); red (2.5YR 4/6); dry to moist; very stiff; 75% silt; 5% clay; 20% fine to coarse sand; subangular; no odor. | | | |
| 70 | | | | | Same as above (65 ft); 80% silt; 5% clay; 15% fine to medium sand; subangular; no odor. | ML | | |
| 75 | | | | | SILT (ML); red (2.5YR 4/6); dry to moist; very stiff; 95% silt; 5% very fine to fine sand; no odor. | | Bentonite Seal | |
| 80 | | | | | SILT with Sand (ML); reddish yellow (5YR 6/6); dry; very stiff; 80% silt; 20% very fine sand; no odor. | | | Kelly down @ 1707 on 3/4/11. New connection @ 1715 on 3/4/11. Resumed drilling @ 0752 on 3/5/11. Stopped advancing @ 0803 due to hammer problems. Resumed drilling @ 0853. |
| | | | | | Well graded SAND with Silt (SW-SM); reddish yellow (5YR 6/6); dry; very dense; 90% very fine to coarse sand; subangular; 10% silt with minor clay; no odor. | SW-SM | | |
| 85 | | | | | SILT (ML); red (2.5YR 4/6); moist; very stiff; 95% silt; 5% clay; no odor. | ML | | |
| | | | | | Lean CLAY (CL); red (2.5YR 4/6); moist; very stiff; low plasticity; 95% clay with minor silt; 5% very fine to fine sand; no odor. | CL | | |
| 90 | | | | | | ML | | |

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# Borehole ID: KAFB-106116

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/4/2011
Date TD Reached: 3/6/2011
Date Completed: 3/10/2011

Ground Elevation AMSL (ft): 5346.2
Y Coordinate: 1473298.77
X Coordinate: 1541894.10

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); red (2.5YR 4/6); dry to moist; very stiff; 95% silt; 5% very fine to fine sand; no odor. | ML | | |
| 95 | | | | | Poorly graded SAND with Silt (SP-SM); light reddish brown (2.5YR 6/3); dry to moist; dense to very dense; 90% very fine to fine sand; 10% silt; no odor. | SP-SM | | |
| | | SB0121 | 0.0 | | | | | Blow counts (97-98.5'): 29/42. |
| 100 | | | | | Same as above (95 ft); very dense; 90% very fine to medium sand; subangular to subrounded; 10% silt; no odor. | | | Kelly down @ 0907. New connection @ 0932. Resumed drilling @ 0933. |
| 105 | | | | | Poorly graded SAND (SP); light reddish brown (2.5YR 6/3); dry to moist; very dense; 100% very fine to fine sand; no odor. | SP | Bentonite Seal | |
| 110 | | | | | SILT (ML); reddish brown (2.5YR 5/4); dry to moist; very stiff; 80% silt; 15% clay; 5% very fine to fine sand; no odor. | ML | | |
| | | | | | Sandy SILT (ML); light reddish brown (2.5YR 7/4); dry; very stiff; 70% silt; 30% very fine sand; no odor. | | | |
| 115 | | | | | SILT (ML); light reddish brown (2.5YR 7/4); dry; very stiff; 90% silt; 10% very fine sand; no odor. | | | |
| 120 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/2/11 10:01 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106116

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/4/2011
Date TD Reached: 3/6/2011
Date Completed: 3/10/2011

Ground Elevation AMSL (ft): 5346.2
Y Coordinate: 1473298.77
X Coordinate: 1541894.10

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Well graded SAND with Silt (SW-SM); light reddish brown (2.5YR 7/4); dry; dense to very dense; 90% very fine to coarse sand; subangular; 10% silt; no odor. | SW-SM | | Kelly down @ 0945. Total depth of 11-3/4" casing @ 120'. New connection @ 1215. Resumed drilling @ 1216. |
| 125 | | | | | SILT (ML); reddish brown (2.5YR 5/4); dry to moist; very stiff; 95% silt; 5% clay; no odor. | ML | | |
| 130 | | | | | Lean CLAY (CL); reddish brown (2.5YR 5/4); dry to moist; very stiff; medium plasticity; 90% clay; 10% very fine to fine sand; no odor.<br>Same as above (127 ft); no odor. | CL | Bentonite Seal | |
| 135 | | | | | Poorly graded SAND (SP); pale red (2.5YR 6/2); dry; very dense; 95% very fine to fine sand; 5% silt; pumice clasts; rounded; no odor. | SP | Top of Filter Pack | Likely top of Santa Fe Group. |
| 140 | | | | | Same as above (135 ft); no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1252. New connection @ 1305. Resumed drilling @ 1307. |
| 145 | | | | | Poorly graded SAND (SP); pale red (2.5YR 6/2); dry; very dense; 100% medium to coarse sand; subangular to subrounded; trace fine sand; no odor. | | | Very dusty discharge, fines likely blown out of sample. Sample contained clay nodules, likely from inside discharge hose. Not representative. |
| | X | SB0122 | 0.1 | | | | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106116

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/4/2011
Date TD Reached: 3/6/2011
Date Completed: 3/10/2011

Ground Elevation AMSL (ft): 5346.2
Y Coordinate: 1473298.77
X Coordinate: 1541894.10

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Lean CLAY with Sand (CL); reddish brown (2.5YR 5/4); dry to moist; hard; low to medium plasticity; 80% clay; 5% silt; 15% very fine to fine sand; no odor. | CL | Bottom of Screen | Blow counts (147-148.5'): 32/50. New connection @ 1332. Resumed drilling @ 1333. |
| | | | | | SILT with Sand (ML); light reddish brown (2.5YR 6/4); dry to moist; very stiff; 85% silt; 15% very fine to fine sand; no odor. | ML | | |
| 155 | | | | | Silty SAND (SM); pale red (2.5YR 6/2); dry; very dense; 85% very fine to coarse sand; subangular to subrounded; 15% silt; no odor. | SM | | |
| 160 | | | | | Same as above (155 ft); no odor. | | | New connection @ 1349. Resumed drilling @ 1350. |
| 165 | | | | | Well graded SAND (SW); pale red (2.5YR 6/2); dry; very dense; 95% very fine to coarse sand; subangular; trace cobbles to 10cm; 5% silt; no odor. | SW | Bentonite Seal | |
| 170 | | | | | Same as above (165 ft); abraded pumice fragments to 2cm; no odor. | | | |
| 175 | | | | | Same as above (165 ft); abundant pumice; no odor. | | | |
| 180 | | | | | | | | |

# Borehole ID: KAFB-106116

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/4/2011
Date TD Reached: 3/6/2011
Date Completed: 3/10/2011

Ground Elevation AMSL (ft): 5346.2
Y Coordinate: 1473298.77
X Coordinate: 1541894.10

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Poorly graded SAND (SP); pale red (2.5YR 6/2); dry; very dense; 100% very fine sand; trace fine sand; no odor. | | | Kelly down @ 1357. New connection @ 1403. Resumed drilling @ 1404. |
| 185 | | | | | Poorly graded SAND (SP); pale red (2.5YR 6/2); dry; very dense; 95% very fine to meduim sand; subrounded; 5% silt; no odor. | SP | | |
| 190 | | | | | Same as above (185 ft); no odor. | | | |
| 195 | | | | | Well graded SAND (SW); pale red (2.5YR 6/2); dry; very dense; 95% very fine to coarse sand; subangular to subrounded; 5% silt; no odor. | | Bentonite Seal | |
| | | SB0123 | 0.1 | | | | | Blow counts (197-198.5'): 11/17. |
| 200 | | | | | Same as above (195 ft); no odor. | SW | | Kelly down @ 1412. New connection @ 1429. Resumed drilling @ 1430. |
| 205 | | | | | Poorly graded SAND (SP); pale red (2.5YR 6/2); dry; dense to very dense; 95% very fine to fine sand; 5% silt; no odor. | SP | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106116

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/4/2011
Date TD Reached: 3/6/2011
Date Completed: 3/10/2011

Ground Elevation AMSL (ft): 5346.2
Y Coordinate: 1473298.77
X Coordinate: 1541894.10

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded SAND (SP); pale red (2.5YR 6/2); dry; dense to very dense; 95% very fine to fine sand; trace medium to coarse sand; subrounded; 5% silt; no odor. | SP | | |
| 215 | | | | | Well graded SAND (SW); pale red (2.5YR 6/2); dry; dense to very dense; 100% fine to coarse sand; subangular to subrounded; trace very fine sand; no odor. | SW | | |
| 220 | | | | | Well graded GRAVEL with Sand (GW); pale red (2.5YR 6/2); dry; dense to very dense; 80% fine to coarse gravel to 7.5cm; subrounded; 20% fine to coarse sand; subrounded to subangular; no odor. | GW | Bentonite Seal | Kelly down @ 1440. New connection @ 1449. Resumed drilling @ 1450. |
| 225 | | | | | Well graded SAND (SW); pale red (2.5YR 6/2); dry; dense to very dense; 100% very fine to coarse sand; subangular to subrounded; no odor. | SW | | |
| 230 | | | | | Same as above (225 ft); no odor. | | | |
| | | | | | Silty SAND (SM); light gray (5YR 7/1); dry; dense to very dense; 70% very fine sand; trace fine sand; 30% silt; no odor. | SM | | |
| 235 | | | | | Well graded SAND (SW); pale red (2.5YR 6/2); dry; dense to very dense; 95% very fine to coarse sand; subangular to subrounded; 5% silt; no odor. | SW | Top of Filter Pack | |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106116

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/4/2011
Date TD Reached: 3/6/2011
Date Completed: 3/10/2011

Ground Elevation AMSL (ft): 5346.2
Y Coordinate: 1473298.77
X Coordinate: 1541894.10

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND (SW); pale red (2.5YR 6/2); dry; dense to very dense; 95% very fine to coarse sand; subangular to subrounded; trace fine to coarse gravel to 2.5cm; subrounded; 5% silt; no odor. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1457. New connection @ 1505. Resumed drilling @ 1506. |
| 245 | | | | | Same as above (240 ft); no odor. | | | |
| | | SB0124 | 2.1 | | | | | Blow counts (247-248.5'): 12/22. |
| 250 | | | | | Clayey SAND with Gravel (SC); pinkish gray (5YR 7/2); dry to moist; dense; 65% very fine to fine sand; trace medium sand; subangular; 15% fine to coarse gravel to 5cm; subrounded; 20% clay with minor silt; no odor. | SC | Bottom of Screen | Kelly down @ 1510. New connection @ 1524. Resumed drilling @ 1525. |
| 255 | | | | | Clayey SAND (SC); pinkish gray (5YR 7/2); dry to moist; dense; 80% very fine to fine sand; 20% clay with minor silt; no odor. | | | |
| 260 | | | | | SILT with Sand (ML); pinkish gray (5YR 7/2); dry to moist; hard to very hard; 85% silt; trace clay; 15% very fine sand; trace fine sand; no odor. | ML | Bentonite Seal | Kelly down @ 1529. New connection @ 1538. Resumed drilling @ 1538. |
| 265 | | | | | Same as above (258 ft); pinkish gray (5YR 6/2); no odor. | | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106116

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/4/2011
Date TD Reached: 3/6/2011
Date Completed: 3/10/2011

Ground Elevation AMSL (ft): 5346.2
Y Coordinate: 1473298.77
X Coordinate: 1541894.10

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND (SP); pale red (2.5YR 7/2); dry; very dense; 95% very fine to fine sand; 5% silt; no odor. | SP | | |
| 275 | | | | | Same as above (270 ft); no odor. | | | |
| 280 | | | | | Lean CLAY (CL); reddish brown (5YR 5/4); dry to moist; very stiff to hard; low to medium plasticity; 90% clay; 5% silt; 5% very fine to fine sand; no odor. | CL | | Kelly down @ 1557. New connection @ 1605. Resumed drilling @ 1606. |
| 285 | | | | | Poorly graded SAND (SP); pale red (2.5YR 7/2); dry; dense to very dense; 95% very fine to fine sand; 5% silt; no odor. Same as above (282 ft); no odor. | SP | Bentonite Seal | |
| 290 | | | | | Same as above (282 ft); 95% very fine to medium sand; subangular to subrounded; 5% silt; no odor. | | | |
| 295 | | | | | Well graded SAND (SW); pale red (2.5YR 7/2); dry; dense to very dense; 100% very fine to coarse sand; subangular to subrounded; no odor. Note: minor clay coating on medium to coarse sand. | SW | | |
| | | SB0125 | 0.0 | | | | | Blow counts (297-298.5'): 4/6. Blow counts (298.5-300'): 7/7. Note: 1st split spoon contained |
| 300 | | SB0125 | | | | | | |

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# Borehole ID: KAFB-106116

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/4/2011
Date TD Reached: 3/6/2011
Date Completed: 3/10/2011

Ground Elevation AMSL (ft): 5346.2
Y Coordinate: 1473298.77
X Coordinate: 1541894.10

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded GRAVEL with Sand (GW); pale red (2.5YR 7/2); dry; medium dense to dense; 85% fine to coarse gravel to 5cm; subangular to subrounded; 15% fine to coarse sand; subangular to subrounded; no odor. | GW | | only gravel. Kelly down @ 1627. New connection @ 1650. Resumed drilling @ 1651. |
| 305 | | | | | Poorly graded SAND (SP); pale red (2.5YR 7/2); dry; medium dense to dense; 95% very fine to medium sand; subangular to subrounded; 5% silt; no odor. | SP | | |
| 310 | | | | | Well graded GRAVEL with Sand (GW); pale red (2.5YR 7/2); dry; medium dense to dense; 85% fine to coarse gravel to 5cm; subangular to subrounded; 15% fine to coarse sand; subangular to subrounded; no odor. | GW | | |
| 315 | | | | | Poorly graded SAND with Gravel (SP); pale red (2.5YR 7/2); dry; medium dense to dense; 80% medium to coarse sand; subangular; 20% fine to coarse gravel to 3cm; subrounded to subangular; no odor. | SP | Bentonite Seal | |
| 320 | | | | | Same as above (315 ft); no odor. | SP | | Kelly down @ 1708 on 3/5/11. New connection @ 1715 on 3/5/11. Resumed drilling @ 0750 on 3/6/11. |
| 325 | | | | | Well graded SAND (SW); reddish gray (2.5YR 5/1); dry; dense; 95% very fine to coarse sand; subrounded; 5% fine gravel to 1.5cm; subrounded; no odor. | SW | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106116

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/4/2011
Date TD Reached: 3/6/2011
Date Completed: 3/10/2011

Ground Elevation AMSL (ft): 5346.2
Y Coordinate: 1473298.77
X Coordinate: 1541894.10

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND (SW); reddish gray (2.5YR 5/1); dry; dense; 100% very fine to coarse sand; subrounded; trace fine gravel to 1cm; subrounded; no odor. | | | |
| 335 | | | | | Same as above (330 ft); higher % of very fine to fine sand than at 330'; no gravel; no odor. | SW | Bentonite Seal | |
| 340 | | | | | Well graded SAND with Gravel (SW); pale red (2.5YR 7/2); dry; dense; 75% very fine to coarse sand; subangular to subrounded; 25% fine to coarse gravel to 4cm; subangular to subrounded; no odor. | | Top of Filter Pack<br>Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 0807. New connection @ 0817. Resumed drilling @ 0818. |
| 345 | | | | | Poorly graded SAND (SP); pale red (2.5YR 7/2); dry; dense; 95% very fine to fine sand; trace medium to coarse sand; subangular to subrounded; 5% silt; no odor. | | | |
| | | SB0126 | 0.0 | | | SP | | Blow counts (347-348.5'): 8/12. |
| 350 | | | | | Same as above (342 ft); medium dense; no odor. | | Bottom of Screen | Kelly down @ 0829. New connection @ 0850. Resumed drilling @ 0851. |
| 355 | | | | | Well graded SAND (SW); pale red (2.5YR 7/2); dry; medium dense to dense; 100% very fine to coarse sand; subangular to subrounded; no odor. | SW | Bentonite Seal | |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106116

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/4/2011
Date TD Reached: 3/6/2011
Date Completed: 3/10/2011

Ground Elevation AMSL (ft): 5346.2
Y Coordinate: 1473298.77
X Coordinate: 1541894.10

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND with Gravel (SW); pale red (2.5YR 7/2); dry; dense; 80% fine to coarse sand; subangular to subrounded; 20% fine to coarse gravel to 4cm; subrounded; no odor. | SW | | Kelly down @ 0901. New connection @ 0915. Resumed drilling @ 0916. |
| | | | | | Lean CLAY (CL); dark reddish brown (5YR 3/3); dry to moist; stiff to very stiff; medium plasticity; 95% clay; 5% very fine sand; no odor. | CL | | |
| 365 | | | | | Well graded SAND (SW); pale red (2.5YR 7/2); dry; dense; 95% very fine to coarse sand; subangular to subrounded; 5% fine gravel to 1.5cm; subrounded; no odor. | SW | | |
| 370 | | | | | Poorly graded SAND (SP); pale red (2.5YR 7/2); dry; dense; 100% very fine to fine sand; no odor. | SP | | |
| 375 | | | | | Same as above (370 ft); 100% very fine to medium sand; trace coarse sand; subangular to subrounded; no odor. | | Bentonite Seal | |
| 380 | | | | | Same as above (370 ft); no odor. | | | Kelly down @ 0944. New connection @ 1001. Resumed drilling @ 1002. |
| 385 | | | | | Well graded SAND (SW); pale red (2.5YR 7/2); dry; dense; 100% very fine to coarse sand; subangular to subrounded; no odor. | SW | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106116

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/4/2011
Date TD Reached: 3/6/2011
Date Completed: 3/10/2011

Ground Elevation AMSL (ft): 5346.2
Y Coordinate: 1473298.77
X Coordinate: 1541894.10

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); pale red (2.5YR 7/2); dry; dense; 100% very fine to coarse sand; subangular to subrounded; no odor. | SW | | |
| 395 | | | | | Clayey SAND (SC); light reddish brown (2.5YR 6/4); dry; dense; 80% very fine to coarse sand; subangular; 20% clay as nodules and as coating on sand; low to medium plasticity; no odor. | SC | | |
| | | SB0127 | 0.3 | | | | | Blow counts (397-398.5'): 9/50. |
| 400 | | | | | Poorly graded SAND (SP); pale red (2.5YR 7/2); dry; very dense; 95% very fine to fine sand; 5% silt; no odor. | SP | | Kelly down @ 1027. New connection. Resumed drilling. |
| 405 | | | | | Well graded SAND (SW); pale red (2.5YR 7/2); dry; very dense; 100% very fine to coarse sand; subangular to subrounded; no odor. | SW | Bentonite Seal | |
| 410 | | | | | Same as above (405 ft); no odor. | | | |
| 415 | | | | | Poorly graded SAND (SP); pale red (2.5YR 7/2); dry; dense to very dense; 100% very fine to fine sand; trace medium to coarse sand; subangular to subrounded; no odor. | SP | | |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106116

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/4/2011
Date TD Reached: 3/6/2011
Date Completed: 3/10/2011

Ground Elevation AMSL (ft): 5346.2
Y Coordinate: 1473298.77
X Coordinate: 1541894.10

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND (SP); pale red (2.5YR 7/2); dry; dense to very dense; 100% very fine to fine sand; trace medium to coarse sand; subangular to subrounded; no odor. | | | Kelly down @ 1119. New connection @ 1131. Resumed drilling @ 1132. |
| 425 | | | | | Same as above (420 ft); no odor. | | | |
| 430 | | | | | Same as above (420 ft); 100% very fine to medium sand; trace coarse sand; subangular to subrounded; no odor. | | Bentonite Seal | |
| 435 | | | | | Same as above (420 ft); no odor. Note: brief, heavy discharge of gravel at 437'. | SP | Top of Filter Pack | |
| 440 | | | | | Poorly graded SAND with Gravel (SP); pale red (2.5YR 7/2); dry; dense to very dense; 80% medium to coarse sand; subangular to subrounded; trace fine sand; 20% fine gravel to 1.5cm; subangular to subrounded; no odor. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1302. New connection @ 1312. Resumed drilling @ 1313. |
| 445 | | | | | Poorly graded SAND (SP); pale red (2.5YR 7/2); dry; dense to very dense; 100% very fine to fine sand; trace medium to coarse sand; subangular to subrounded; no odor at 445'. Hydrocarbon odor at 447'. | | | |
| | | SB0128 | 104.0 | | | | | Blow counts (447-448.5'): 20/50. PID - breathing zone: 1.3ppm |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106116

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/4/2011
Date TD Reached: 3/6/2011
Date Completed: 3/10/2011

Ground Elevation AMSL (ft): 5346.2
Y Coordinate: 1473298.77
X Coordinate: 1541894.10

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Poorly graded SAND (SP); light reddish brown (2.5YR 6/3); dry; very dense; 95% very fine to fine sand; 5% silt; hydrocarbon odor. | SP | Bottom of Screen | Kelly down @ 1338. New connection @ 1401. Resumed drilling @ 1402. |
| 455 | | | | | Well graded SAND (SW); pale red (2.5YR 7/2); dry; very dense; 95% very fine to coarse sand; subangular; 5% silt; slight hydrocarbon odor. | SW | | Total Depth = 456 ft. Reached @ 1426 on 3/6/11. |
| 460 | | | | | | | | Water added during drilling (gallons) = 0 |
| | | | | | | | | Water added during construction (gallons) = Not Recorded |
| 465 | | | | | | | | Spud: started drilling from surface. |
| 470 | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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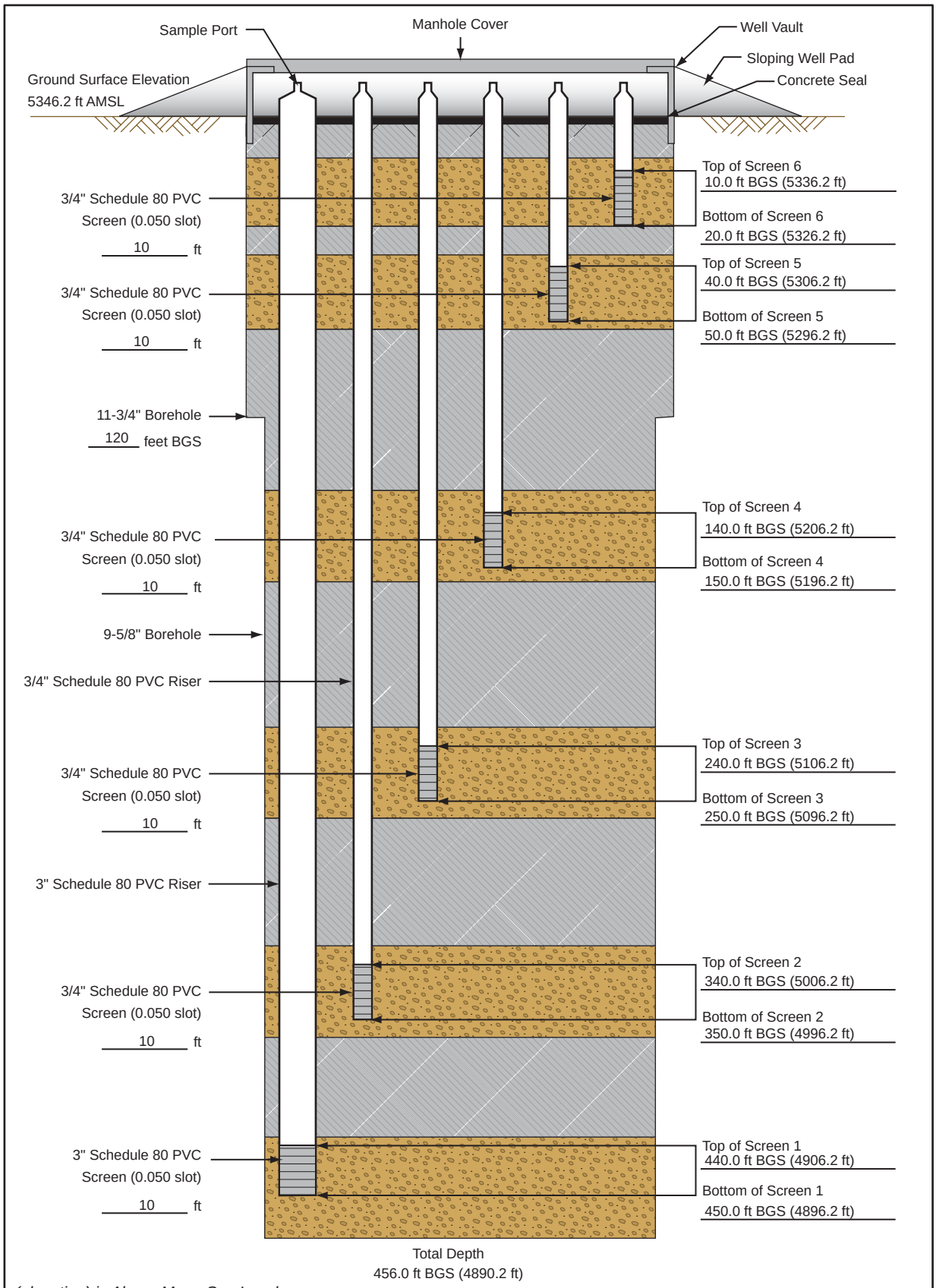
# Nested Soil Vapor Well Completion Diagram for KAFB-106116

Installation Start Date/Time: 3/7/2011 @ 08:15
Installation End Date/Time: 3/10/2011 @ 12:32



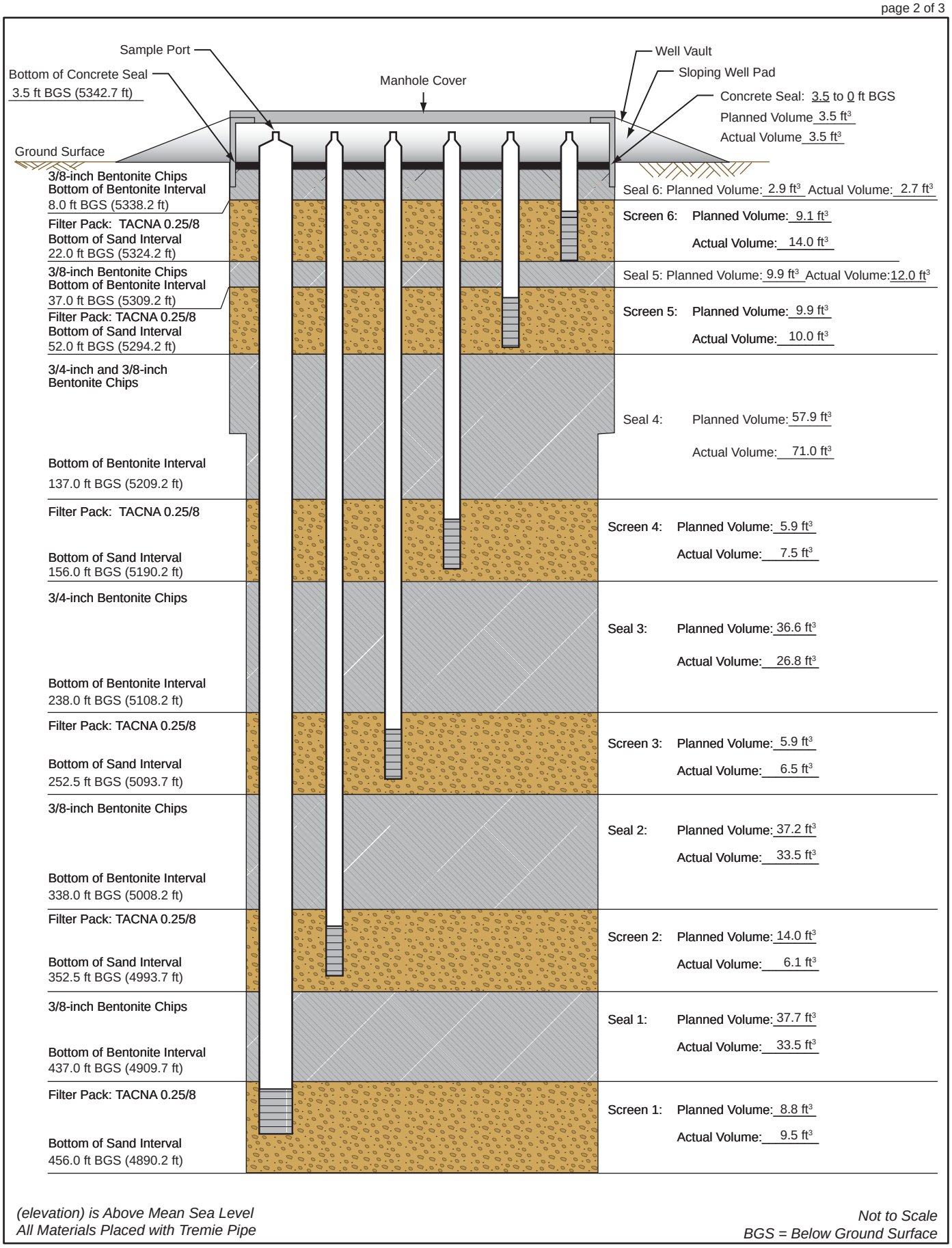



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106116






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

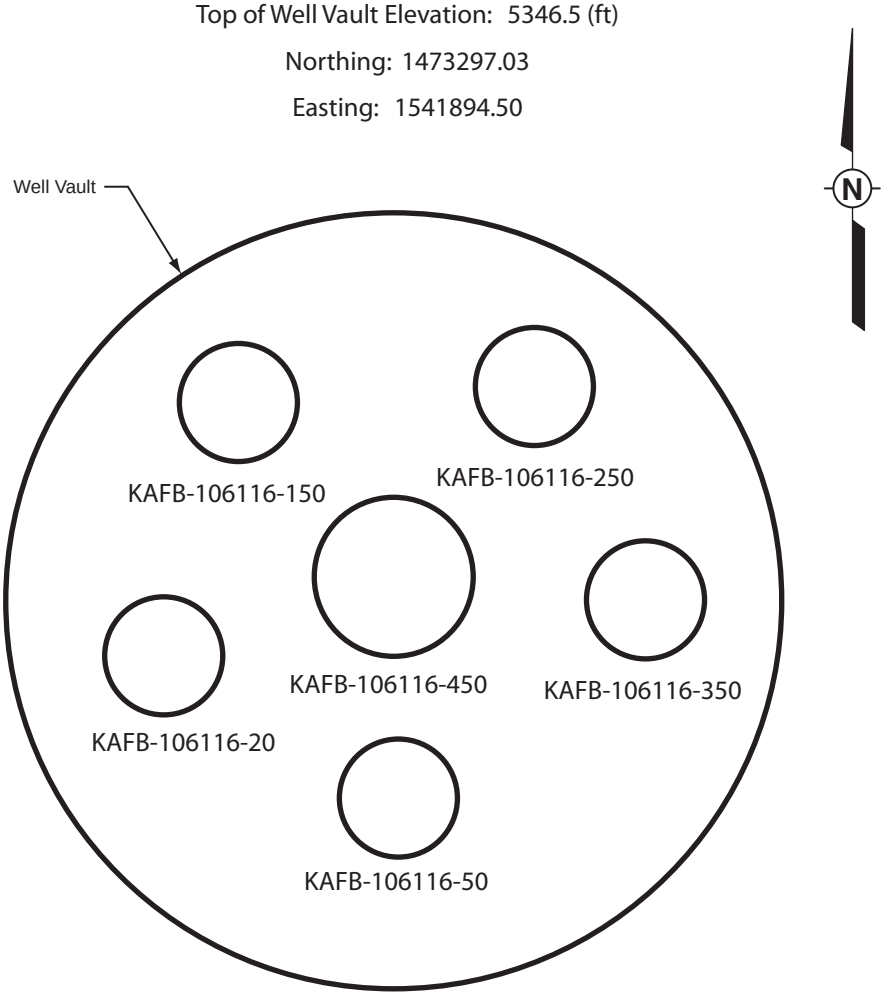
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106116



Top of Well Vault Elevation: 5346.5 (ft)

Northing: 1473297.03

Easting: 1541894.50




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106116-20 | 3/4 | 20.0 | 10.0 - 20.0 | 1473296.42 | 1541894.58 | 5346.0 |
| KAFB-106116-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1473296.44 | 1541894.90 | 5346.0 |
| KAFB-106116-150 | 3/4 | 150.0 | 140.0 - 150.0 | 1473296.67 | 1541894.47 | 5346.0 |
| KAFB-106116-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1473296.88 | 1541894.69 | 5346.0 |
| KAFB-106116-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1473296.72 | 1541894.97 | 5346.0 |
| KAFB-106116-450 | 3 | 450.0 | 440.0 - 450.0 | 1473296.72 | 1541894.69 | 5346.0 |

# Borehole ID: KAFB-106117

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/7/2011
Date TD Reached: 3/8/2011
Date Completed: 3/15/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473368.67
X Coordinate: 1541727.74

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Asphalt | | | Hand augered. |
| | | | | | No description recorded; disturbed. | | Concrete Seal | |
| 5 | | | | | Poorly graded SAND with Silt (SP-SM); light brown (7.5YR 6/4); slightly moist; loose; 85% very fine to fine sand; 5% gravel; 10% silt. | | | Began drilling @ 0810 on 3/7/11. |
| | | SB0129 | 0.5 | | | | | Blow counts (7-8.5'): 9/11. |
| 10 | | | | | Same as above (5 ft). | SP-SM | Bentonite Seal<br>Top of Filter Pack | |
| 15 | | | | | Silty SAND (SM); light brown (7.5YR 6/4); slightly moist; loose; 85% very fine to fine sand; 15% silt. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| | | SB0130 | 0.1 | | | | | Blow counts (17-18.5'): 13/15. Blow counts (18.5-20'): Not Recorded. |
| 20 | | SB0130 | | | Silty SAND (SM); brown (7.5YR 5/4); slightly moist; loose; 80% fine sand; 20% silt; trace clay. | SM | | |
| 25 | | | | | Same as above (20 ft); 70% sand; 20% silt; 10% clay. | | Bottom of Screen | |
| | | SB0131 | 0.2 | | | | Bentonite Seal | Blow counts (27-28.5'): 15/21. |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/2/11 09:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106117

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/7/2011
Date TD Reached: 3/8/2011
Date Completed: 3/15/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473368.67
X Coordinate: 1541727.74

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Sandy lean CLAY (CL); brown (7.5YR 4/3); slightly moist; firm; 60% clay; 40% very fine to fine sand. | CL | Bentonite Seal | |
| 35 | | | | | Silty SAND (SM); brown (7.5YR 5/4); slightly moist; medium dense; 80% fine sand; 20% silt. | SM | Top of Filter Pack | Blow counts (37-38.5'): 19/23. |
| | | SB0132 | 0.3 | | | | | |
| 40 | | | | | Clayey SAND (SC); brown (7.5YR 4/3); dry; medium dense; 60% fine sand; 40% clay. | SC | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 45 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); slightly moist; medium dense; 95% fine sand; subrounded; 5% silt. | SP | | Blow counts (47-48.5'): 18/23. Blow counts (48.5-50'): Not Recorded. |
| | | SB0133 SB0133-MS | 0.4 | | | | | |
| 50 | | SB0133-MSD | 0.4 | | | | Bottom of Screen | |
| 55 | | | | | Clayey SAND (SC); brown (7.5YR 4/3); dry; medium dense; 60% fine sand; 40% clay. | SC | | |
| 60 | | | | | Silty SAND (SM); brown (7.5YR 4/4); slightly moist; medium dense; 75% fine sand; subrounded; 25% silt. | SM | Bentonite Seal | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/2/11 09:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106117

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/7/2011
Date TD Reached: 3/8/2011
Date Completed: 3/15/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473368.67
X Coordinate: 1541727.74

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Silty SAND (SM); brown (7.5YR 4/4); slightly moist; medium dense; 75% fine sand; subrounded; 25% silt. | SM | | |
| 65 | | | | | Poorly graded SAND (SP); strong brown (7.5YR 5/6); slightly moist; medium dense; 90% fine sand; 5% coarse sand; subangular; trace gravel; 5% silt. | SP | | |
| 70 | | | | | Silty SAND (SM); brown (7.5YR 4/4); 80% fine sand; 5% coarse sand; 15% silt. | SM | Bentonite Seal | |
| 75 | | | | | Same as above (70 ft); 85% fine sand; 15% silt. | | | |
| 80 | | | | | Poorly graded SAND (SP); strong brown (7.5YR 5/6); 100% fine sand. | SP | | |
| 85 | | | | | Silty SAND (SM); strong brown (7.5YR 5/6); 80% fine sand; 5% coarse sand and gravel; 15% silt. | SM | | |
| 90 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/2/11 09:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106117

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/7/2011
Date TD Reached: 3/8/2011
Date Completed: 3/15/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473368.67
X Coordinate: 1541727.74

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Silty SAND (SM); strong brown (7.5YR 5/6); 80% fine sand; 5% coarse sand and gravel; 15% silt. | SM | | |
| 95 | | | | | Poorly graded SAND (SP); strong brown (7.5YR 5/6); slightly moist; medium dense; 85% fine sand; 10% medium sand; 5% coarse sand. | | | |
| | | SB0134 | 0.3 | | | | | Blow counts (97-98.5'): Not Recorded. |
| 100 | | | | | Same as above (95 ft); yellowish brown (10YR 5/4). | | | |
| 105 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); slightly moist; medium dense; 70% fine sand; 15% medium sand; 10% coarse sand; 5% gravel. | SP | Bentonite Seal | |
| 110 | | | | | Same as above (105 ft); 90% fine sand; 10% medium to coarse sand; trace gravel. | | | |
| 115 | | | | | Same as above (105 ft); 90% fine sand; 10% medium to coarse sand; trace gravel. | | | |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106117

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/7/2011
Date TD Reached: 3/8/2011
Date Completed: 3/15/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473368.67
X Coordinate: 1541727.74

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Poorly graded SAND (SP); yellowish brown; slightly moist; medium dense; 100% fine sand; subangular to subrounded; trace medium to coarse sand; trace silt. | SP | | |
| 125 | | | | | No cuttings returned. | | | Poor recovery due to obstruction in air hose. Possibly due to clay layer. |
| 130 | | | | | No cuttings returned. | | Bentonite Seal | |
| 135 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); slightly moist; medium dense; 100% fine sand. | | Top of Filter Pack | |
| 140 | | | | | Same as above (135 ft). | SP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 145 | | | | | Same as above (135 ft). | | | |
| | | SB0135 | 0.5 | | | | | Blow counts (147-148.5'): 27/38. |
| 150 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/2/11 09:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106117

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/7/2011
Date TD Reached: 3/8/2011
Date Completed: 3/15/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473368.67
X Coordinate: 1541727.74

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Sandy lean CLAY (CL); brown (10YR 5/3); firm; 60% clay; 40% fine sand. | CL | Bottom of Screen | |
| 155 | | | | | Poorly graded SAND (SP); light yellowish brown (10YR 6/4); slightly moist; medium dense; 80% fine sand; 10% medium sand; 10% coarse sand. | SP | | |
| 160 | | | | | Same as above (155 ft); very pale brown (10YR 7/4); 95% fine sand; 5% medium sand. | | | |
| 165 | | | | | Same as above (155 ft); 90% fine sand; 10% medium sand. | | Bentonite Seal | |
| 170 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); 40% fine sand; 40% medium sand; 20% coarse sand; trace gravel. | SW | | |
| 175 | | | | | Same as above (170 ft). | | | |
| 180 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/2/11 09:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106117

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/7/2011
Date TD Reached: 3/8/2011
Date Completed: 3/15/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473368.67
X Coordinate: 1541727.74

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); medium dense; 100% fine sand; trace medium sand. | SP | | |
| 185 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); slightly moist; medium dense; 30% fine sand; 50% medium sand; 20% coarse sand. | SW | | |
| 190 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); 100% fine sand; trace medium to coarse sand. | | | |
| 195 | | | | | Same as above (190); 85% fine sand; 15% coarse sand. | | Bentonite Seal | |
| | | SB0136 SB0137 | 0.1 | | | SP | | Blow counts (197-198.5'): 17/23. |
| 200 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); 40% coarse sand; 40% medium sand; 10% fine sand; 10% gravel to 30mm; subrounded. | | | |
| 205 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); slightly moist; medium dense; 45% fine sand; 30% medium sand; 20% coarse sand; 5% gravel to 25mm. | SW | | |
| 210 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/2/11 09:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106117

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/7/2011
Date TD Reached: 3/8/2011
Date Completed: 3/15/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473368.67
X Coordinate: 1541727.74

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); slightly moist; medium dense; 30% fine sand; 30% medium sand; 30% coarse sand; 10% gravel to 25mm. | | | |
| 215 | | | | | Same as above (210 ft); 20% fine sand; 30% medium sand; 35% coarse sand; 15% gravel. | | | |
| 220 | | | | | Same as above (210 ft); gravel to 35mm. | SW | Bentonite Seal | |
| 225 | | | | | Same as above (210 ft). | | | |
| 230 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/6); slightly moist; medium dense; 80% fine sand; 15% medium sand; 5% coarse sand. | | | |
| 235 | | | | | Same as above (230 ft); 60% fine sand; 30% medium sand; 10% coarse sand; possible shell fragments. | SP | Top of Filter Pack | |
| 240 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/2/11 09:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106117

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/7/2011
Date TD Reached: 3/8/2011
Date Completed: 3/15/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473368.67
X Coordinate: 1541727.74

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND (SW); pale yellowish brown (10YR 6/4); 35% coarse sand; 35% medium sand; 30% fine sand. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 245 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); 95% fine sand; 5% silt. | SP | | |
| | | SB0138 | 20.5 | | | | | Blow counts (247-248.5'): 22/30. |
| 250 | | | | | Silty SAND (SM); pale brown (10YR 6/3); slightly moist; medium dense; 85% fine sand; 15% silt. | SM | Bottom of Screen | |
| 255 | | | | | Sandy SILT (ML); grayish brown (10YR 5/2); firm; 60% silt; 40% fine sand. | ML | | |
| 260 | | | | | Poorly graded SAND with Silt (SP-SM); brown (10YR 5/3); medium dense; 80% fine sand; 10% medium to coarse sand; 10% silt. | SP-SM | Bentonite Seal | |
| 265 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/6); medium dense; 35% fine sand; 35% medium sand; 30% coarse sand; subangular to subrounded. | SW | | |
| 270 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/2/11 09:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

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**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/7/2011
Date TD Reached: 3/8/2011
Date Completed: 3/15/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473368.67
X Coordinate: 1541727.74

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/6); medium dense; 35% fine sand; 35% medium sand; 30% coarse sand; subangular to subrounded. | | | |
| 275 | | | | | Same as above (270 ft). | SW | | |
| 280 | | | | | Same as above (270 ft). | | | |
| 285 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); medium dense; 80% fine sand; 20% medium sand; subangular. | | Bentonite Seal | |
| 290 | | | | | Same as above (285 ft); 70% fine sand; 20% medium sand; 10% coarse sand. | SP | | |
| 295 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); 35% fine sand; 35% coarse sand; 30% medium sand. | | | |
| | | SB0139 | 9.8 | | | SW | | Blow counts (297-298.5'): 13/17. Blow counts (298.5-300'): Not Recorded. |
| 300 | | SB0139 | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/2/11 09:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106117

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/7/2011
Date TD Reached: 3/8/2011
Date Completed: 3/15/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473368.67
X Coordinate: 1541727.74

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | | | | |
| | | | | | Poorly graded GRAVEL (GP); dark grayish brown (10YR 4/2); 95% coarse gravel; subangular to subrounded; 5% fine gravel and sand. | GP | | |
| 305 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/6); 85% fine sand; 10% coarse sand; 5% gravel. | SP | | |
| 310 | | | | | | | | |
| | | | | | Well graded SAND with Gravel (SW); dark grayish brown (10YR 4/2); 35% fine sand; 25% medium sand; 25% coarse sand; 15% fine to coarse gravel to 40mm. | SW | | |
| 315 | | | | | | | Bentonite Seal | |
| | | | | | Well graded GRAVEL (GW); dark grayish brown (10YR 4/2); 50% coarse gravel; 40% fine gravel; subangular to subrounded; 10% fine to coarse sand. | GW | | |
| 320 | | | | | | | | |
| | | | | | Well graded SAND with Gravel (SW); dark grayish brown (10YR 4/2); 35% fine sand; 25% medium sand; 25% coarse sand; 15% fine to coarse gravel to 40mm. | | | |
| 325 | | | | | Same as above (320 ft). | SW | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/2/11 09:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106117

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/7/2011
Date TD Reached: 3/8/2011
Date Completed: 3/15/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473368.67
X Coordinate: 1541727.74

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND with Gravel (SW); dark grayish brown (10YR 4/2); 35% fine sand; 20% medium sand; 20% coarse sand; 25% fine gravel. | SW | Bentonite Seal | |
| 335 | | | | | Poorly graded SAND (SP); light yellowish brown (10YR 6/4); very slightly moist; medium dense; 100% fine sand; trace coarse gravel to 25mm. | SP | Top of Filter Pack | |
| 340 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); 70% fine sand; 15% medium to coarse sand; 10% fine to coarse gravel; 5% silt. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 345 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); 100% sand. | SW | | |
| | | SB0140 | 7.7 | | | | | Blow counts (347-348.5'): 13/21. |
| 350 | | | | | Poorly graded SAND (SP); grayish brown (10YR 5/2); 40% fine sand; 40% medium sand; 10% coarse sand; 10% gravel. Note: 3in hard sandy siltstone found in split spoon sample. | SP | Bottom of Screen | |
| 355 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); 30% fine sand; 30% medium sand; 30% coarse sand; subangular to subrounded; 10% gravel. | SW | Bentonite Seal | |
| 360 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/2/11 09:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106117

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/7/2011
Date TD Reached: 3/8/2011
Date Completed: 3/15/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473368.67
X Coordinate: 1541727.74

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); 30% fine sand; 30% medium sand; 30% coarse sand; subangular to subrounded; 10% gravel. | | | |
| 365 | | | | | Same as above (360 ft); yellowish brown (10YR 5/4). | SW | | |
| 370 | | | | | Poorly graded SAND (SP); grayish brown (10YR 5/2); 80% medium sand; 10% fine sand; 10% coarse sand. | | | |
| 375 | | | | | Poorly graded SAND (SP); dark grayish brown (10YR 4/2); 90% coarse sand; 10% medium sand; trace fine sand; trace fine gravel; subangular to angular. | SP | Bentonite Seal | |
| 380 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); very slightly moist; medium dense; 40% coarse sand; 40% medium sand; 20% fine sand. | | | |
| 385 | | | | | Same as above (380 ft). | SW | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106117

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/7/2011
Date TD Reached: 3/8/2011
Date Completed: 3/15/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473368.67
X Coordinate: 1541727.74

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); very slightly moist; medium dense; 40% coarse sand; 40% medium sand; 20% fine sand. | SW | | |
| 395 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 80% fine sand; 20% medium sand. | | | |
| | | SB0141 | 6.3 | | | | | Blow counts (397-398.5'): Not Recorded. |
| 400 | | | | | Same as above (395 ft); 60% fine sand; 30% medium sand; 5% coarse sand; 5% coarse gravel. | | | |
| 405 | | | | | Same as above (395 ft); yellowish brown (10YR 5/4). | SP | Bentonite Seal | |
| 410 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); medium dense; 100% fine sand. | | | |
| 415 | | | | | Same as above (410 ft); 60% fine sand; 40% medium sand. | | | |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106117

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/7/2011
Date TD Reached: 3/8/2011
Date Completed: 3/15/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473368.67
X Coordinate: 1541727.74

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); slightly moist; medium dense; 40% medium sand; 30% fine sand; 30% coarse sand; subangular to subrounded. | | | |
| 425 | | | | | Same as above (420 ft); very dense. | SW | | |
| 430 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); very dense; 80% medium sand; 20% fine sand. | | Bentonite Seal | |
| 435 | | | | | Same as above (430 ft); 5% coarse gravel; angular. | | | |
| 440 | | | | | Same as above (430 ft). | SP | Top of Filter Pack<br>Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 445 | | | | | Same as above (430 ft). | | | |
| | | SB0142 | 12.7 | | | | | Blow counts (447-448.5'): 13/11. |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106117

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/7/2011
Date TD Reached: 3/8/2011
Date Completed: 3/15/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473368.67
X Coordinate: 1541727.74

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); very dense; 90% fine sand; 10% medium sand. | SP | Bottom of Screen | |
| 455 | | | | | Same as above (450 ft); dry; 100% very fine to fine sand. | | | |
| 460 | | | | | Poorly graded SAND with Silt (SP-SM); yellowish brown (10YR 5/4); slightly moist; medium dense; 60% fine sand; 20% medium sand; 10% coarse sand; 10% silt. | SP-SM | | Total Depth = 460 ft. Reached @ 1600 on 3/8/11.<br>Water added during drilling (gallons) = 0<br>Water added during construction (gallons) = Not recorded |
| 465 | | | | | | | | |
| 470 | | | | | | | | |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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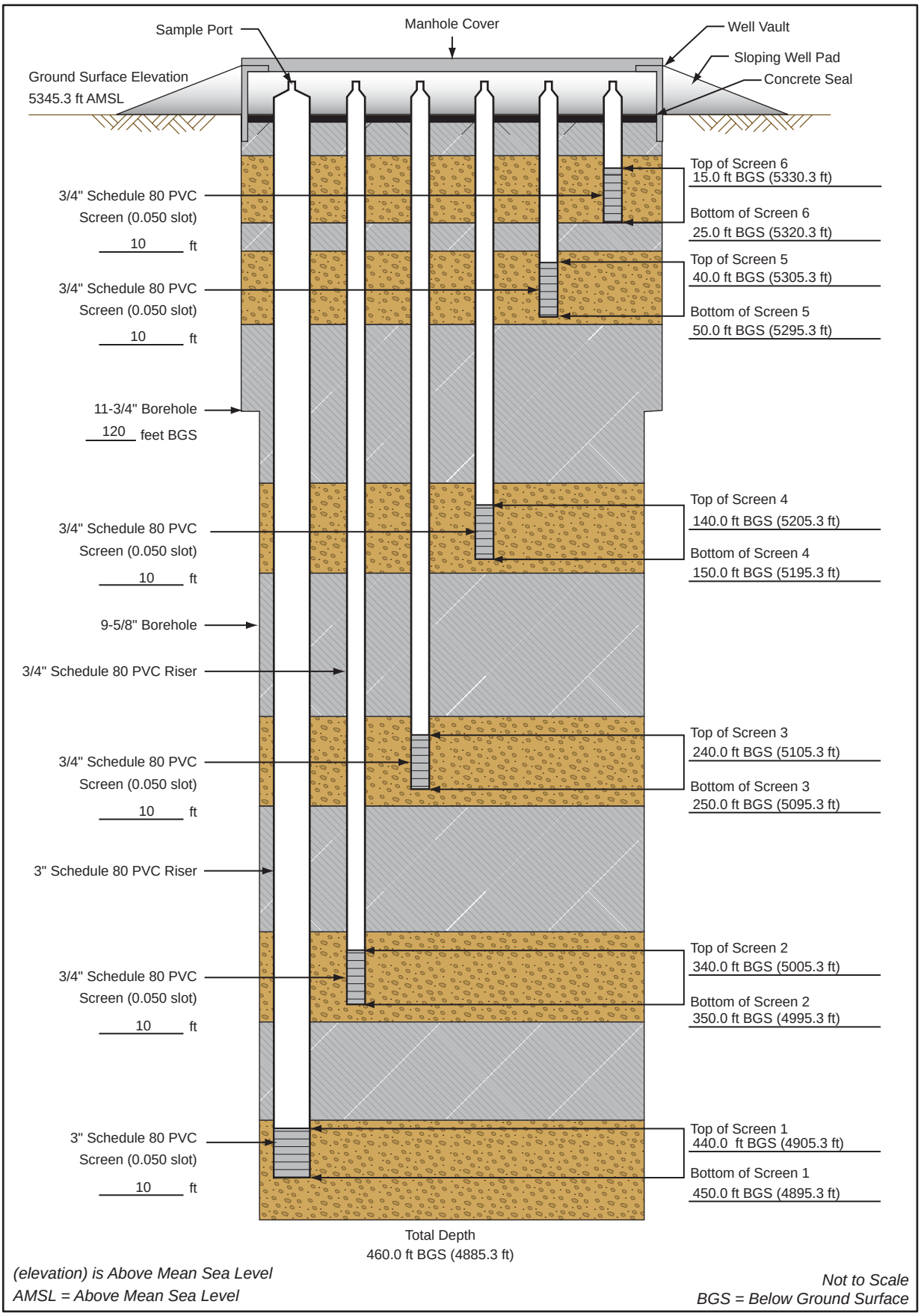
# Nested Soil Vapor Well Completion Diagram for KAFB-106117

Installation Start Date/Time: 3/8/2011 @ 16:30
Installation End Date/Time: 3/15/2011 @ 13:00



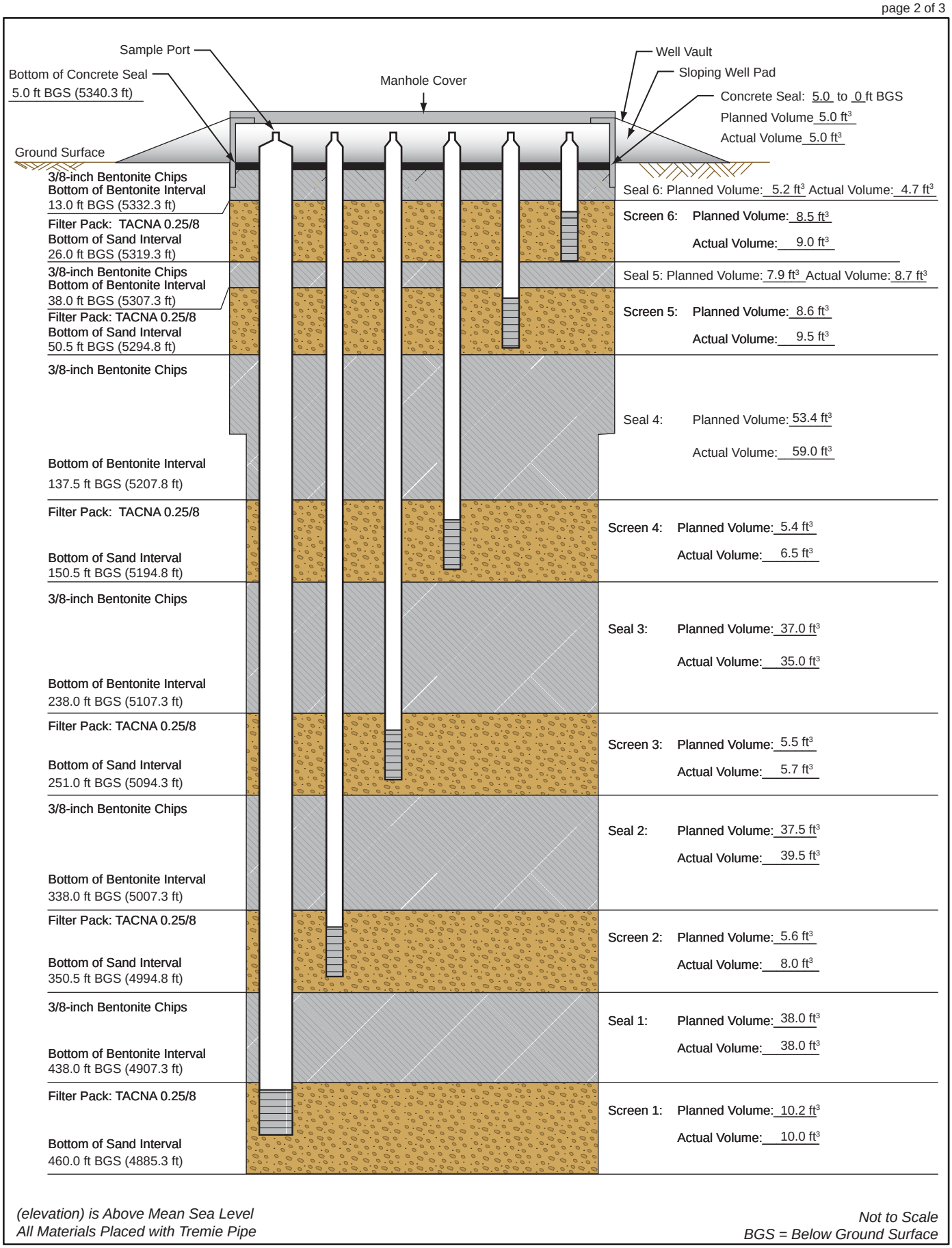



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106117






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

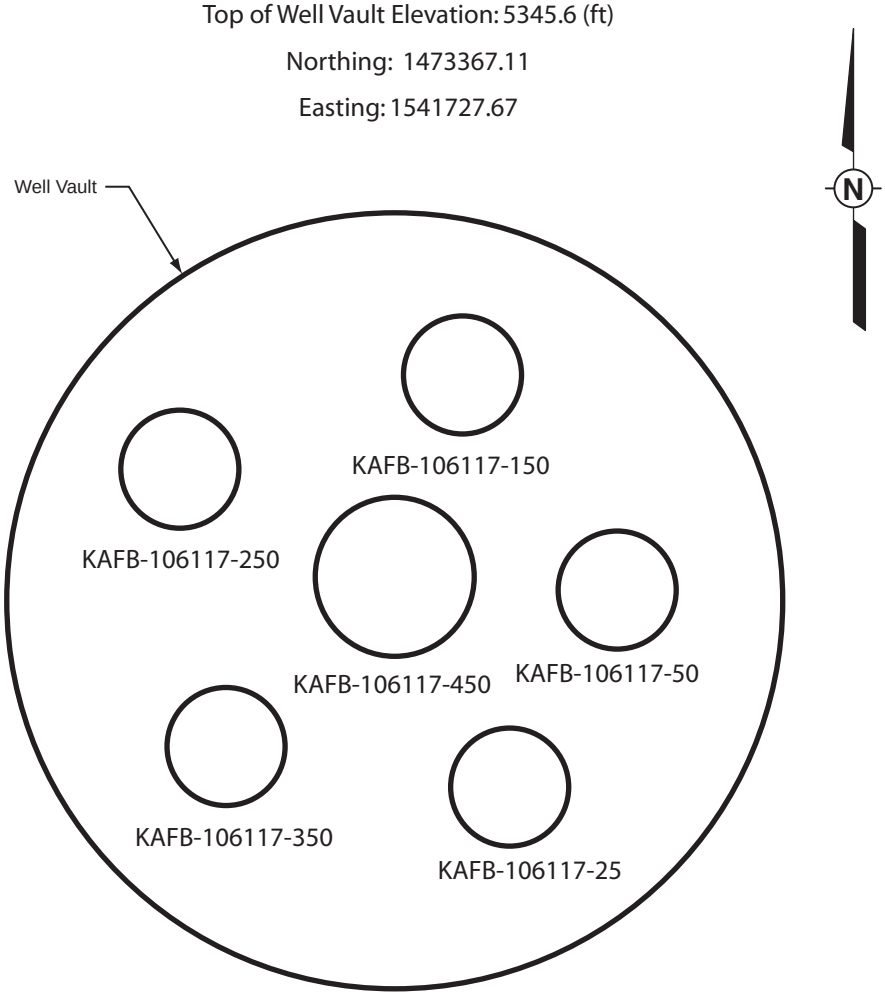
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106117



Top of Well Vault Elevation: 5345.6 (ft)

Northing: 1473367.11

Easting: 1541727.67




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106117-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1473366.34 | 1541727.84 | 5344.8 |
| KAFB-106117-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1473366.56 | 1541727.98 | 5344.8 |
| KAFB-106117-150 | 3/4 | 150.0 | 140.0 - 150.0 | 1473366.81 | 1541727.79 | 5344.8 |
| KAFB-106117-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1473366.70 | 1541727.52 | 5344.8 |
| KAFB-106117-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1473366.42 | 1541727.53 | 5344.8 |
| KAFB-106117-450 | 3 | 450.0 | 440.0 - 450.0 | 1473366.68 | 1541727.76 | 5344.8 |

# Borehole ID: KAFB-106118

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/24/2011
Date TD Reached: 3/3/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473742.98
X Coordinate: 1541791.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | SILT (ML); brown (7.5YR 5/2); dry; stiff; nonplastic; 95% silt; 5% fine gravel; rounded; no odor. | | Concrete Seal | Hand augered. |
| 5 | | | | | Same as above (0 ft). | | | Began drilling @ 1127 on 2/24/11. |
| | | SB0143 | 0.4 | | | | Bentonite Seal | Blow counts (7-8.5'): 7/8. |
| 10 | | | | | Same as above (0 ft); 90% silt; 10% fine to coarse sand; subrounded. | | Top of Filter Pack | |
| 15 | | | | | Same as above (0 ft); non to low plasticity. | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1150. New connection @ 1254. Resumed drilling @ 1256. |
| | | SB0144 | 0.0 | | | | | Blow counts (17-18.5'): 16/15. Bow counts (18.5-20'): 16/15. |
| 20 | | SB0144 | | | Same as above (0 ft). | | | |
| 25 | | | | | SILT (ML); brown (7.5YR 5/2); dry; firm to stiff; low plasticity; 85% silt; 10% clay; 5% gravel; silt nodules to 1.5cm; no odor. | | Bottom of Screen | Kelly down @ 1304. |
| | | SB0145 | 0.0 | | | | Bentonite Seal | Blow counts (27-28.5'): 6/12. Blow counts (28.5-30'): 14/20. New connection @ 1325. |
| 30 | | SB0146 | 0.0 | | | | | |

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# Borehole ID: KAFB-106118

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/24/2011
Date TD Reached: 3/3/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473742.98
X Coordinate: 1541791.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); brown (7.5YR 5/2); dry; firm; non to low plasticity; 100% silt with clay nodules to 1cm; no odor. | | | Resumed drilling @ 1325. |
| 35 | | | | | Same as above (30 ft); 90% silt; 10% clay nodules. | | Bentonite Seal | Kelly down @ 1335. |
| | | SB0147 | 0.0 | | | | Top of Filter Pack | Blow counts (37-38.5'): 7/11. New connection @ 1347. Resumed drilling @ 1347. |
| 40 | | | | | Same as above (30 ft). | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 45 | | | | | Same as above (30 ft); very stiff. | | | Kelly down @ 1353. |
| | | SB0148 | 0.0 | | | | | Blow counts (47-48.5'): 23/27. Blow counts (48.5-50'): 47/50. Blow counts (50-51.5'): 42/50. New connection @ 1417. Resumed drilling @ 1418. |
| 50 | | SB0148 | | | | | | |
| | | SB0148 | | | Silty SAND (SM); brown (7.5YR 5/4); dry; dense; 75% fine to coarse sand; rounded; 10% gravel; rounded; 15% silt; no odor. | | Bottom of Screen | |
| 55 | | | | | Same as above (50 ft); 80% fine to coarse sand; 5% gravel; 15% silt. | SM | Bentonite Seal | Kelly down @ 1420. New connection @ 1430. Resumed drilling @ 1431. |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106118

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/24/2011
Date TD Reached: 3/3/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473742.98
X Coordinate: 1541791.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT (ML); brown (7.5YR 5/2); dry; firm; nonplastic; 100% silt; no odor. | ML | | |
| 65 | | | | | Well graded SAND with Silt (SW-SM); brown (7.5YR 4/3); dry; dense; 85% fine to coarse sand; subangular to angular; 5% gravel to 1cm; subangular; 10% silt; no odor. | SW-SM | | |
| 70 | | | | | SILT (ML); brown (7.5YR 4/3); very dry; stiff to very stiff; nonplastic; 100% silt; trace gravel to 2cm; no odor. | | | |
| 75 | | | | | Same as above (70 ft). | | Bentonite Seal | Kelly down @ 1436. New connection @ 1447. Resumed drilling @ 1447. |
| 80 | | | | | Same as above (70 ft); 90% silt; 10% fine to coarse sand; siltstone fragments to 2cm. | ML | | |
| 85 | | | | | Same as above (70 ft). | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106118

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/24/2011
Date TD Reached: 3/3/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473742.98
X Coordinate: 1541791.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT with Sand (ML); brown (7.5YR 4/4); dry; stiff to firm; nonplastic; 75% silt; 25% fine sand; rounded; no odor. | ML | | |
| 95 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); dry; dense; 100% fine to coarse sand; rounded; large quantity of lapilli tuff; rounded; no odor. | SW | | Kelly down @ 1500. |
| | | SB0149 | 0.0 | | | | | Blow counts (97-98.5'): 16/28. New connection @ 1516. Resumed drilling @ 1517. |
| 100 | | | | | Same as above (95 ft). | | | |
| 105 | | | | | SILT (ML); brown (7.5YR 5/3); dry; stiff; nonplastic; 95% silt; 5% fine to coarse sand; no odor. | | Bentonite Seal | |
| 110 | | | | | Same as above (103 ft). | ML | | |
| 115 | | | | | Same as above (103 ft). | | | Kelly down @ 1527. Tripped in 9 5/8" casing. End of 2/24/11. New connection @ 0950 on 3/1/11. Resumed drilling @ 0953. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106118

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/24/2011
Date TD Reached: 3/3/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473742.98
X Coordinate: 1541791.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Lean CLAY (CL); brown (7.5YR 4/3); dry; stiff to very stiff; medium plasticity; 100% clay; no odor. | | | |
| 125 | | | | | Same as above (120 ft); brown (7.5YR 5/3). | CL | | |
| 130 | | | | | Same as above (120 ft); low to medium plasticity. | | Bentonite Seal | |
| 135 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 95% fine to medium sand; rounded; 5% fines; trace mica flakes; no odor. | | | Kelly down @ 1007. New connection @ 1014. Resumed drilling @ 1015. |
| 140 | | | | | Same as above (134 ft); trace coarse sand. | SP | | |
| 145 | | | | | SILT (ML); brown (10YR 4/3); dry; stiff to very stiff; low plasticity; 95% silt; 5% gravel to 2cm; rounded; no odor. | | | Kelly down @ 1020. |
| | X | SB0150 | 0.4 | | | ML | Top of Filter Pack | Blow counts (147-148.5'): 12/50. New connection @ 1040. Resumed drilling @ 1042. |
| 150 | | | | | | | | |

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**Project Location:** KAFB, Albuquerque, NM
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Y Coordinate: 1473742.98
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Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; dense; 95% fine to medium sand; rounded; trace coarse sand; 5% fines; no odor. | SP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Approximate top of Santa Fe Group. |
| 155 | | | | | Same as above (150 ft); 85% fine to medium sand; trace coarse sand; 10% gravel to 1cm; rounded; 5% fines. | | | Kelly down @ 1045. New connection @ 1052. Resumed drilling @ 1055. |
| 160 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; dense; 100% fine to coarse sand; rounded; trace gravel; rounded; no odor. | SW | Bottom of Screen | |
| 165 | | | | | Same as above (160 ft); dominantly fine sand. | | | |
| 170 | | | | | Same as above (160 ft). | | Bentonite Seal | |
| 175 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; rounded; no odor. | SP | | Kelly down @ 1059. New connection @ 1111. Resumed drilling @ 1111. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106118

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/24/2011
Date TD Reached: 3/3/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473742.98
X Coordinate: 1541791.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; rounded; no odor. | SP | | |
| 185 | | | | | Well graded SAND (SW); brown (10YR 5/3); 95% fine to coarse sand; evenly distributed; rounded; 5% gravel to 1cm; rounded; no odor. | SW | | |
| 190 | | | | | Same as above (185 ft); 35% of coarse fraction of sand is lapilli tuff. | | | |
| 195 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 100% fine to medium sand; rounded; no odor. Note: 3cm clay nodule in split spoon sample. | SP | Bentonite Seal | Kelly down @ 1129. |
| | | SB0151 | 0.1 | | | | | Blow counts (197-198.5'): 9/50. New connection @ 1322. Resumed drilling @ 1327. |
| 200 | | | | | Same as above (195 ft); 100% fine sand. | | | |
| 205 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; dense; 100% fine to coarse sand; rounded; volcanic in composition; no odor. | SW | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106118

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/24/2011
Date TD Reached: 3/3/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473742.98
X Coordinate: 1541791.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; dense; 95% fine to coarse sand; rounded; volcanic in composition; 5% gravel to 2cm; rounded; no odor. | SW | | |
| 215 | | | | | Same as above (210 ft); 90% fine to coarse sand; 10% gravel to 2.5cm; rounded. | | | Kelly down @ 1333. New connection @ 1340. Resumed drilling @ 1341. |
| 220 | | | | | Poorly graded GRAVEL (GP); dark yellowish brown (10YR 4/4); dry; dense; 90% fine gravel to 3cm; rounded; 10% fine to coarse sand; rounded; no odor. | GP | | |
| 225 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; dense; 95% fine to medium sand; rounded; 5% coarse sand; rounded; trace gravel to 2cm; no odor. | SP | Bentonite Seal | |
| 230 | | | | | Poorly graded GRAVEL with Sand (GP); dark yellowish brown (10YR 4/6); moist; 60% fine gravel to 1.5cm; rounded; 40% fine to coarse sand; rounded; no odor. | GP | | |
| 235 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; dense; 95% fine to medium sand; rounded; 5% gravel; rounded; no odor. | SP | | Kelly down @ 1349. New connection @ 1355. Resumed drilling @ 1355. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106118

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/24/2011
Date TD Reached: 3/3/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473742.98
X Coordinate: 1541791.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded GRAVEL with Sand (GP); dark grayish brown (10YR 4/2); dry; dense; 65% gravel to 2cm; rounded; 35% fine to coarse sand; rounded; no odor. | GP | | |
| | | | | | SILT (ML); brown (10YR 4/3); dry; stiff; nonplastic; 100% silt; no odor. | | | Kelly down @ 1358. |
| 245 | | | | | | | Bentonite Seal | |
| | | SB0152 | 2.9 | | | | | Blow counts (247-248.5'): 26/50. New connection @ 1415. Resumed drilling @ 1416. |
| 250 | | | | | Same as above (243 ft). | ML | Top of Filter Pack | |
| 255 | | | | | Poorly graded SAND (SP); light yellowish brown (10YR 6/4); dry; dense; 95% very fine to fine sand; rounded; 5% fines; no odor. | SP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1420. New connection @ 1428. Resumed drilling @ 1429. |
| 260 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; rounded; trace gravel to 1.5cm; rounded. | | | |
| 265 | | | | | Same as above (260 ft). | SW | Bottom of Screen | |
| | | | | | | | Bentonite Seal | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106118

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/24/2011
Date TD Reached: 3/3/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473742.98
X Coordinate: 1541791.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; rounded; trace gravel to 1.5cm; rounded. | SW | | |
| 275 | | | | | SILT (ML); brown (7.5YR 5/2); dry; stiff to very stiff; nonplastic; 100% silt; trace clay nodules to 2cm; no odor. | ML | | Kelly down @ 1437. New connection @ 1443. Resumed drilling @ 1446. |
| 280 | | | | | Sandy SILT (ML); brown (7.5YR 5/2); dry; stiff; nonplastic; 60% silt; 40% fine sand; rounded; no odor. | | | |
| 285 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; rounded; no odor. | SW | Bentonite Seal | |
| 290 | | | | | Same as above (285 ft). | | | |
| 295 | | | | | Same as above (285 ft); medium dense; 90% fine to coarse sand; rounded; 10% gravel to 1.5cm; rounded. | | | Kelly down @ 1454. |
| | | SB0153 | 0.0 | | | | | Blow counts (297-298.5'): 9/11. New connection @ 1510. Resumed drilling @ 1510. |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106118

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/24/2011
Date TD Reached: 3/3/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473742.98
X Coordinate: 1541791.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; rounded; 5% gravel to 1.5cm; rounded; no odor. | | | |
| 305 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 65% fine to coarse sand; rounded; 35% gravel to 1.5cm; rounded; no odor. | SW | | |
| 310 | | | | | Same as above (305 ft). | | | |
| 315 | | | | | Poorly graded GRAVEL (GP); brown (10YR 4/3); dry; dense; 90% gravel to 2cm; rounded; 10% fine to coarse sand; subrounded; no odor. | GP | Bentonite Seal | Kelly down @ 1520. New connection @ 1527. Resumed drilling @ 1528. |
| 320 | | | | | Poorly graded SAND (SP); grayish brown (10YR 5/2); dry; dense to medium dense; 100% fine sand; rounded; trace medium sand; no odor. | | | |
| 325 | | | | | Same as above (320 ft); 100% fine to medium sand; rounded. | SP | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106118

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/24/2011
Date TD Reached: 3/3/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473742.98
X Coordinate: 1541791.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Poorly graded SAND (SP); grayish brown (10YR 5/2); dry; dense; 95% fine to medium sand; 5% coarse sand; rounded; no odor. | SP | Bentonite Seal | |
| 335 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; trace gravel to 1cm; rounded; no odor. | SW | Top of Filter Pack | Kelly down @ 1539. New connection @ 1610. Resumed drilling @ 1611. |
| 340 | | | | | Poorly graded SAND (SP); grayish brown (10YR 5/2); dry; dense; 100% very fine to fine sand; rounded; no odor. | SP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 345 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; medium dense; 90% fine to coarse sand; rounded; 10% fine gravel to 1.5cm; rounded; no odor. | SW | | Kelly down @ 1622. |
| | | SB0154 | 0.3 | | | | | Blow counts (347-348.5'): 5/11. Blow counts (348.5-350'): 9/17. New connection @ 1647. Resumed drilling @ 1647. |
| 350 | | SB0154 | | | Same as above (345 ft). | | Bottom of Screen | |
| 355 | | | | | Poorly graded GRAVEL (GP); brown (10YR 4/3); dry; dense; 95% fine gravel to 3cm; rounded; 5% fine to coarse sand; rounded; no odor. | GP | Bentonite Seal | Kelly down @ 1700. End of 3/1/11. New connection @ 0828 on 3/2/11. Resumed drilling @ 0834. |
| 360 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; medium dense; 100% fine to coarse sand; subrounded to rounded; no | SW | | |

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# Borehole ID: KAFB-106118

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/24/2011
Date TD Reached: 3/3/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473742.98
X Coordinate: 1541791.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | odor. | | | |
| 365 | | | | | Same as above (358 ft); trace gravel; rounded. | | | |
| 370 | | | | | Same as above (358 ft); subangular to subrounded. | | | |
| 375 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; medium dense; 80% fine to coarse sand; subrounded to rounded; 20% fine gravel to 1cm; no odor. | SW | Bentonite Seal | Kelly down @ 0926. Casing refusal, pulled 120' of casing and redrilled. End of 3/2/11. New connection @ 1126 on 3/3/11. Resumed drilling @ 1128. |
| 380 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; rounded; trace gravel; rounded; no odor. | | | |
| 385 | | | | | Same as above (380 ft); dominantly fine sand. | | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106118

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/24/2011
Date TD Reached: 3/3/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473742.98
X Coordinate: 1541791.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; loose; 100% fine to medium sand; dominantly fine sand; rounded; abundant mica flakes; no odor. | SP | | |
| 395 | | | | | Same as above (390 ft); trace coarse sand. | | | Kelly down @ 1204. |
| | | SB0155 | 19.1 | | Note: 4cm gravel fragment in spilt spoon sample. | | | Blow counts (397-398.5'): 3/5. Blow counts (398.5-400'): 3/5. New connection @ 1310. Resumed drilling @ 1313. |
| 400 | | SB0155 | | | | | | |
| | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; loose to medium dense; 100% fine to coarse sand; subangular to rounded; trace gravel; no odor. | | | |
| 405 | | | | | Same as above (400 ft). | SW | Bentonite Seal | |
| 410 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; loose to medium dense; 100% fine to medium sand; rounded; trace coarse sand; rounded; no odor. | SP | | |
| 415 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; medium dense; 75% fine to coarse sand; rounded; 25% fine gravel; subrounded; no odor. | SW | | Kelly down @ 1346. New connection @ 1422. Resumed drilling @ 1423. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106118

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/24/2011
Date TD Reached: 3/3/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473742.98
X Coordinate: 1541791.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; loose; 85% fine to coarse sand; rounded; 10% fine gravel; rounded; 5% clay nodules; no odor. | SW | | |
| 425 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; loose to medium dense; 95% fine to medium sand; rounded; 5% coarse sand; rounded; trace gravel; rounded; no odor. | SP | Bentonite Seal | |
| 430 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; medium dense; 100% fine to coarse sand; subrounded to rounded; no odor. | SW | | |
| 435 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; medium dense; 60% fine gravel to 1.5cm; subangular to subrounded; 40% fine to coarse sand; rounded; no odor. | GP | Top of Filter Pack | Kelly down @ 1509. New connection @ 1517. Resumed drilling @ 1520. |
| 440 | | | | | Poorly graded SAND with Gravel (SP); brown (10YR 4/3); dry; medium dense; 60% fine to medium sand; rounded; 40% fine gravel to 2cm; rounded; trace clay nodules; no odor. | SP | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 445 | | | | | SILT with Sand (ML); brown (10YR 5/3); slightly moist; firm; nonplastic; 80% silt; 20% very fine sand; no odor. | ML | | Kelly down @ 1537. |
| | | SB0156 | 0.0 | | | | | Blow counts (447-448.5'): 12/11. Blow counts (448.5-450'): 15/12. New connection @ 1605. |
| 450 | | SB0156 | | | Poorly graded SAND (SP); brown (10YR | SP | | |

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# Borehole ID: KAFB-106118

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/24/2011
Date TD Reached: 3/3/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473742.98
X Coordinate: 1541791.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | 4/3); dry; medium dense; 95% fine to medium sand; rounded; 5% coarse sand; rounded; no odor. | SP | Bottom of Screen | Resumed drilling @ 1606. |
| 455 | | | | | Same as above (449 ft). | | | |
| | | | | | SILT (ML); brown (10YR 5/3); dry; firm; nonplastic; 100% silt; no odor. | ML | | |
| 460 | | | | | | | | Total depth = 459.2 ft. Reached @ 1626 on 3/3/11. |
| | | | | | | | | Water added during drilling (gallons): 0 |
| 465 | | | | | | | | Water added during construction (gallons): 423.3 |
| 470 | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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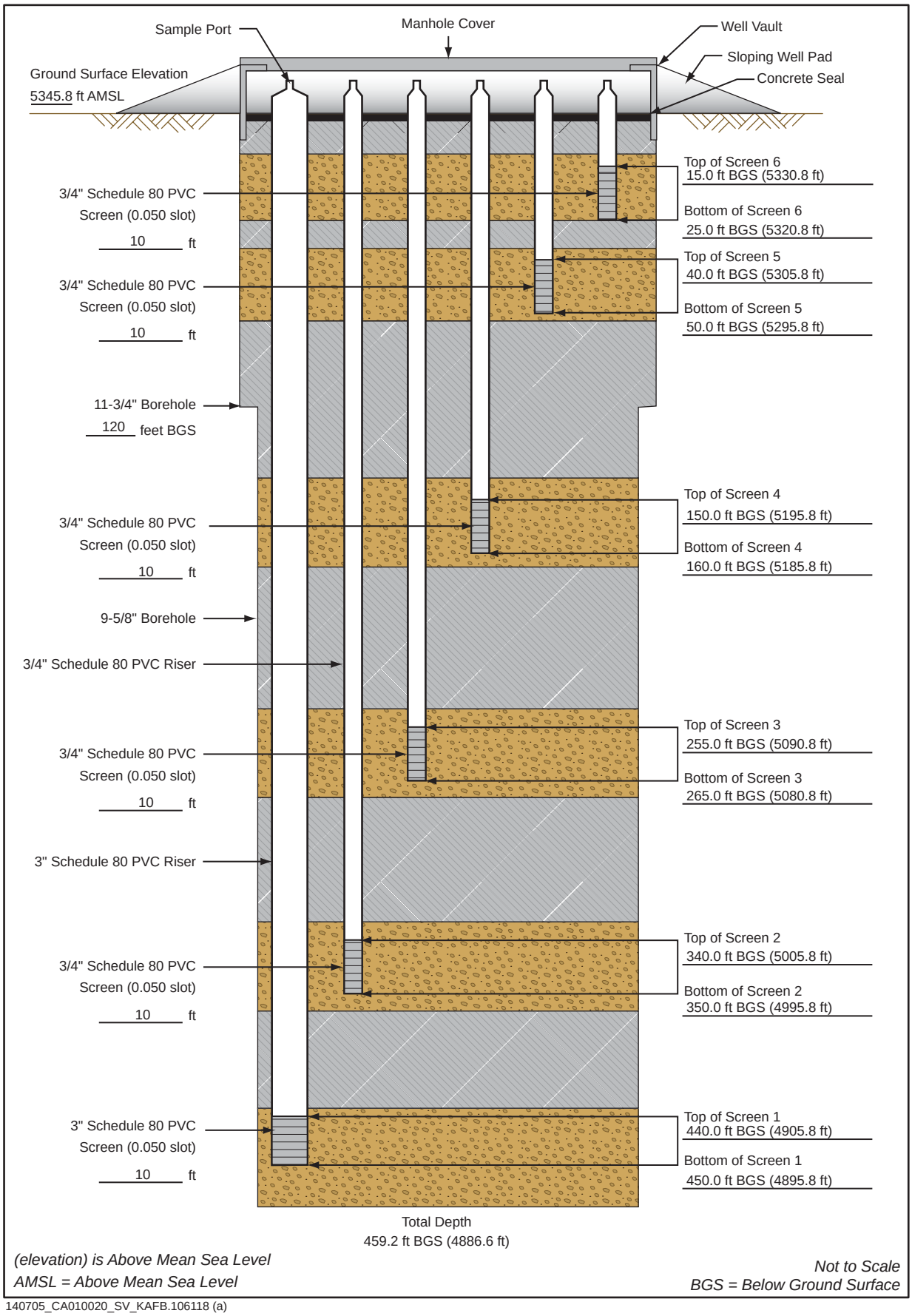
# Nested Soil Vapor Well Completion Diagram for KAFB-106118

Installation Start Date/Time: 3/4/2011 @ 09:20
Installation End Date/Time: 3/7/2011 @ 10:25





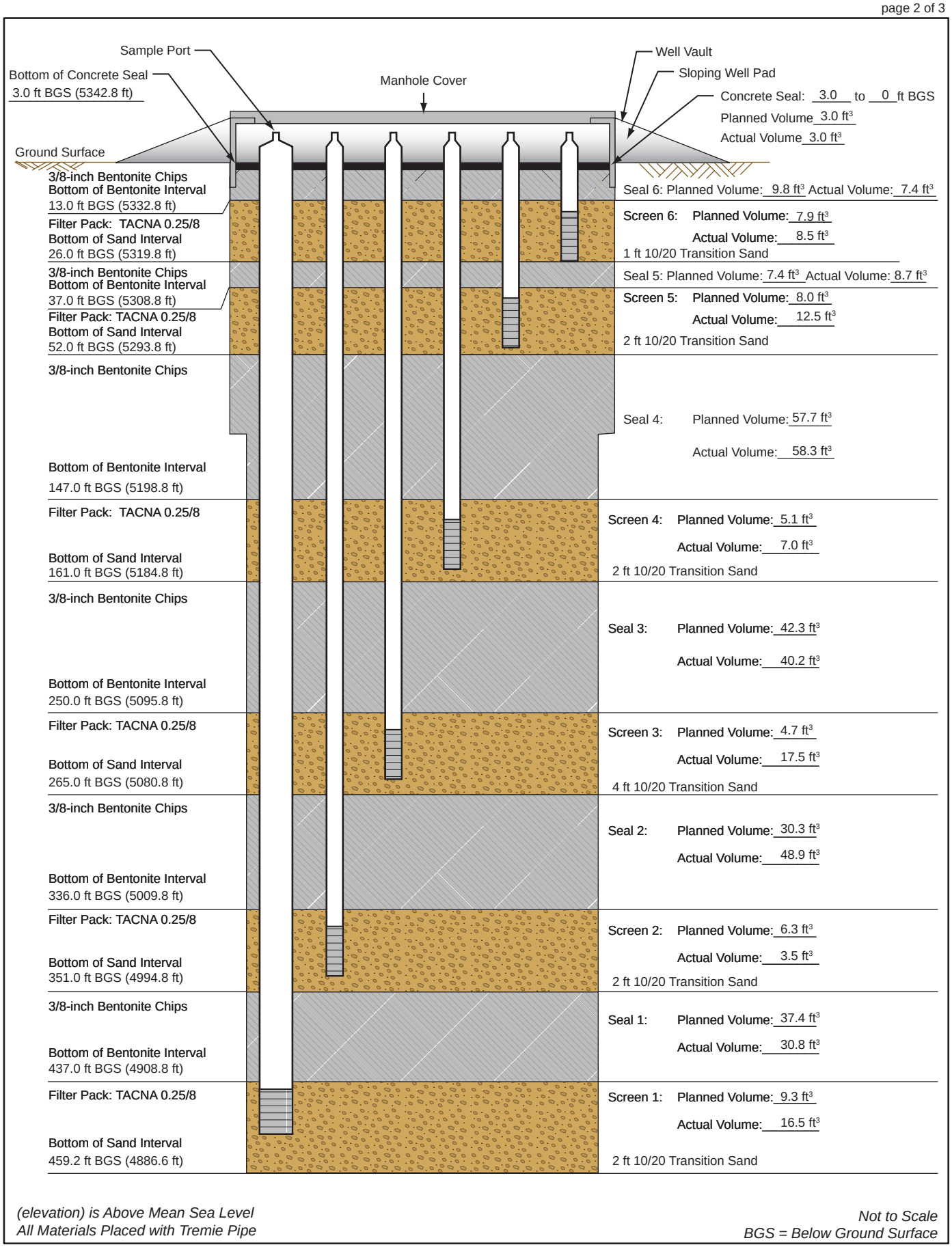

*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

140705_CA010020_SV_KAFB.106118 (a)

# Nested Soil Vapor Well Completion Diagram for KAFB-106118






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

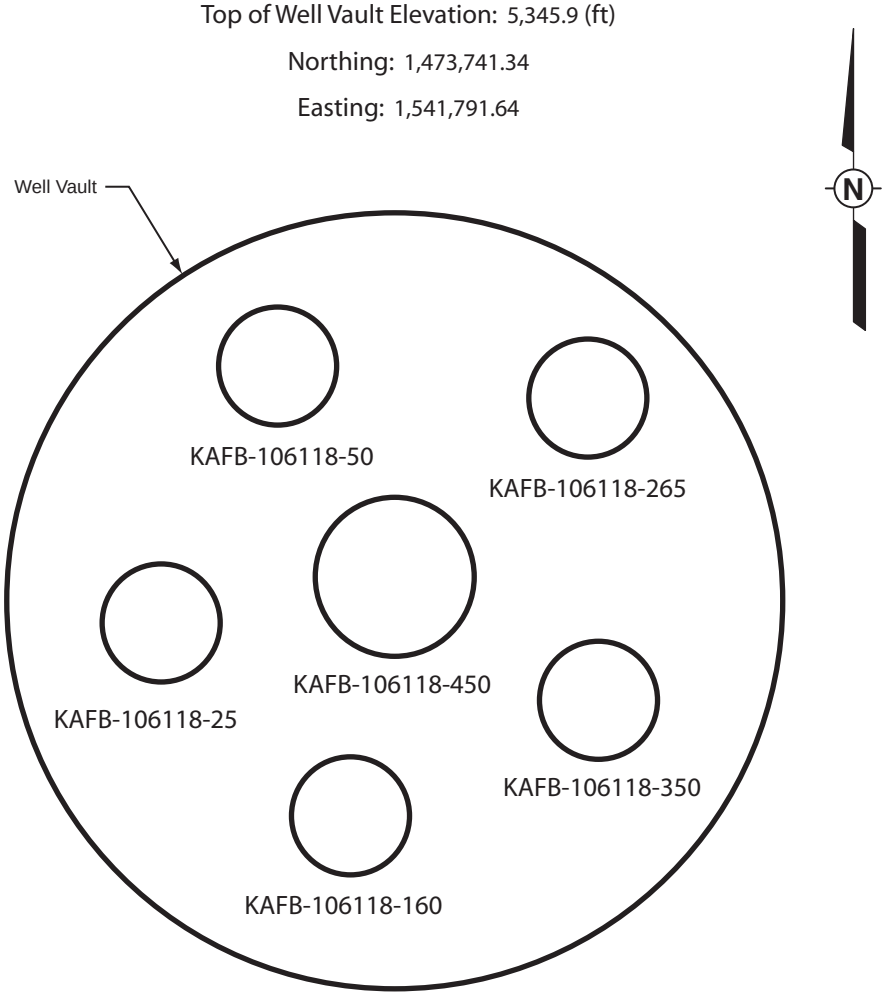
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106118



Top of Well Vault Elevation: 5,345.9 (ft)

Northing: 1,473,741.34

Easting: 1,541,791.64




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106118-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1,473,740.74 | 1,541,791.34 | 5345.5 |
| KAFB-106118-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1,473,741.03 | 1,541,791.43 | 5345.4 |
| KAFB-106118-160 | 3/4 | 160.0 | 150.0 - 160.0 | 1,473,740.55 | 1,541,791.54 | 5345.4 |
| KAFB-106118-265 | 3/4 | 265.0 | 255.0 - 265.0 | 1,473,741.00 | 1,541,791.76 | 5345.5 |
| KAFB-106118-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1,473,740.65 | 1,541,791.83 | 5345.5 |
| KAFB-106118-450 | 3 | 450.0 | 440.0 - 450.0 | 1,473,740.91 | 1,541,791.61 | 5345.4 |

# Borehole ID: KAFB-106119

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/3/2011
Date TD Reached: 3/4/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473521.57
X Coordinate: 1541613.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Sandy SILT (ML); brown (7.5YR 5/3); moist; loose; low plasticity; 65% silt; 35% very fine to medium sand to 2mm. | | Concrete Seal | Hand augered. |
| 5 | | | | | Same as above (0 ft). | | | Began drilling @ 1448 on 3/3/11. |
| | | SB0157 SB0158 | 0.1 | | | | Bentonite Seal | Blow counts (7-8.5'): 14/15. |
| 10 | | | | | Same as above (0 ft); reddish brown (5YR 5/4); very stiff; 60% silt; 5% clay; 35% very fine to meduim sand. | | Top of Filter Pack | Resumed drilling @ 1504. |
| 15 | | | | | Same as above (0 ft); reddish brown (5YR 4/4). | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Bottom of casing @ 1510. |
| | | SB0159 | 0.0 | | | | | Blow counts (17-18.5'): 14/23. Resumed drilling @ 1521. |
| 20 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); moist; hard; low plasticity; 60% silt; 40% very fine to coarse sand; trace fine gravel to 1cm. | | | |
| 25 | | | | | Same as above (20 ft); 40% very fine to medium sand to 2mm; no gravel. | | Bottom of Screen | Bottom of casing @ 1525. |
| | | SB0160 SB0160-MS | 0.0 | | | | Bentonite Seal | Blow counts (27-28.5'): 8/13. Blow counts (28.5-30'): Not Recorded. Resumed drilling @ |
| 30 | | SB0160-MSD | 0.0 | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/26/11 13:27 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106119

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/3/2011
Date TD Reached: 3/4/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473521.57
X Coordinate: 1541613.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); moist; very stiff; low plasticity; 60% silt; trace clay nodules; 40% very fine to coarse sand; trace fine gravel to 1cm. | ML | Bentonite Seal | 1541. |
| 35 | | | | | Same as above (30 ft); hard; 70% silt; 30% very fine to coarse sand to 4.5mm; no clay. | | | |
| | | SB0161 | 0.0 | | Lean CLAY with Sand (CL); reddish brown (5YR 5/4); dry; hard; medium plasticity; 70% clay; 15% silt; 15% very fine to medium sand to 1mm. | CL | Top of Filter Pack | Blow counts (37-38.5'): 11/23. |
| 40 | | | | | No cuttings returned. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Bottom of casing @ 1546. Resumed drilling @ 1554. |
| 45 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); dry; hard; low plasticity; 70% silt; 30% very fine to coarse sand; trace fine gravel to 9mm. | ML | | |
| | | SB0162 | 0.0 | | Silty SAND (SM); brown (7.5YR 5/4); dry; dense; 60% very fine to very coarse sand; 5% fine gravel to 2cm; subrounded; 35% silt. | SM | | Blow counts (47-48.5'): 16/32. |
| 50 | | | | | | | Bottom of Screen | Bottom of casing @ 1559. Resumed drilling @ 1616. |
| 55 | | | | | Sandy SILT (ML); brown (7.5YR 4/4); dry; hard; low plasticity; 60% silt; 10% clay; 30% very fine to medium sand to 3mm. | ML | Bentonite Seal | |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106119

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/3/2011
Date TD Reached: 3/4/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473521.57
X Coordinate: 1541613.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Sandy SILT (ML); brown (7.5YR 4/4); dry; hard; low plasticity; 60% silt; 10% clay; 30% very fine to coarse sand to 4mm. | | | Resumed drilling @ 1628. |
| 65 | | | | | Same as above (60 ft); 60% silt; 40% very fine to coarse sand. | ML | | |
| 70 | | | | | Same as above (60 ft); 50% silt; 20% clay; 30% very fine to fine sand. | | | |
| 75 | | | | | Well graded SAND with Silt (SW-SM); brown (7.5YR 5/3); moist; medium dense; 90% very fine to very coarse sand; trace gravel to 1.4cm; subangular; 10% silt with clay. | SW-SM | Bentonite Seal | Bottom of casing @ 1635. |
| 80 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; very stiff; low plasticity; 80% silt; 20% very fine to medium sand to 1mm. | | | |
| 85 | | | | | Same as above (80 ft). | ML | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106119

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/3/2011
Date TD Reached: 3/4/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473521.57
X Coordinate: 1541613.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | No cuttings returned. | | | |
| 95 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; very stiff; low plasticity; 75% silt; 5% clay nodules; 20% very fine to medium sand to 1mm. | ML | | |
| | | SB0163 | 4.9 | | | | | Blow counts (97-98.5'): 5/23. |
| | | | | | Lean CLAY (CL); lense. | CL | | |
| 100 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; loose; 100% medium sand to 0.5mm; rounded; trace clay nodules. | | | Bottom of casing @ 1652. Resumed drilling @ 1704. |
| 105 | | | | | Same as above (99 ft); 95% medium sand; 5% silt. | SP | Bentonite Seal | |
| 110 | | | | | Lean CLAY (CL); brown (10YR 5/3); damp; hard; medium plasticity; 100% lean clay; trace silt (likely from cyclone). | CL | | |
| 115 | | | | | SILT (ML); brown (7.5YR 5/4); moist; hard; low plasticity; 85% silt; 5% clay; 10% very fine sand. | | | |
| | | | | | Same as above (112 ft). | ML | | |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106119

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/3/2011
Date TD Reached: 3/4/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473521.57
X Coordinate: 1541613.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | No cuttings returned. | | | Bottom of casing @ 1709 on 3/3/11. Resumed drilling @ 1105 on 3/4/11. |
| 125 | | | | | No cuttings returned. | | | |
| 130 | | | | | No cuttings returned. | | Bentonite Seal | |
| 135 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; very dense; 100% medium sand to 0.5mm; rounded. | SP | | |
| 140 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; medium dense; 100% fine to coarse sand to 3mm; rounded. | | Top of Filter Pack<br>Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Bottom of casing @ 1117. Resumed drilling @ 1124. |
| 145 | | | | | Same as above (140 ft); very dense. | SW | | |
| | X | SB0164 | 0.0 | | | | | Blow counts (147-148.5'): 23/50. Bottom of casing @ 1128. |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106119

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/3/2011
Date TD Reached: 3/4/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473521.57
X Coordinate: 1541613.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; medium dense; 100% fine to coarse sand to 3mm; rounded. | | Bottom of Screen | Resumed drilling @ 1142. |
| 155 | | | | | Same as above (150 ft); 95% very fine to very coarse sand; 5% fine gravel to 1.1cm. | | | |
| 160 | | | | | Same as above (150 ft); 95% very fine to very coarse sand; 5% fine gravel to 1.1cm. | | | Bottom of casing @ 1145. Resumed drilling @ 1151. |
| 165 | | | | | Same as above (150 ft); grading finer; no gravel. | SW | Bentonite Seal | |
| 170 | | | | | Same as above (150 ft); grading finer; some pumice. | | | |
| 175 | | | | | Same as above (150 ft). | | | |
| 180 | | | | | | | | Bottom of casing @ 1156. |

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# Borehole ID: KAFB-106119

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/3/2011
Date TD Reached: 3/4/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473521.57
X Coordinate: 1541613.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 95% very fine to very coarse sand; trace fine gravel to 9mm; subrounded to rounded; 5% silt with clay nodules. | SW | Bentonite Seal | Resumed drilling @ 1237. |
| 185 | | | | | Same as above (180 ft). | | | |
| 190 | | | | | Same as above (180 ft). | | | |
| 195 | | | | | Same as above (180 ft). | | | |
| | | SB0165 | 0.0 | | | | | Blow counts (197-198.5'): 4/4. Bottom of casing @ 1242. Resumed drilling @ 1255. |
| 200 | | | | | Same as above (180 ft); fine gravel to 2cm. | | | |
| 205 | | | | | Same as above (180 ft); 90% very fine to very coarse sand; 5% fine gravel; 5% fines. | | | |
| 210 | | | | | Lean CLAY (CL); brown (10YR 5/3); | CL | | |

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# Borehole ID: KAFB-106119

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/3/2011
Date TD Reached: 3/4/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473521.57
X Coordinate: 1541613.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | damp; very stiff; medium plasticity; 100% clay with minor silt; trace fine gravel to 1.9cm; rounded. | CL | | |
| 215 | | | | | Well graded SAND with Silt (SW-SM); brown (10YR 5/3); moist; loose; 90% very fine to very coarse sand; trace fine gravel to 1.5cm; rounded; 10% silt with minor clay nodules. | SW-SM | | |
| 220 | | | | | Well graded SAND (SW); brown (10YR 4/3); moist; medium dense; 100% very fine to very coarse sand; trace fine gravel to 1cm; rounded. | | | Resumed drilling @ 1308. |
| | | | | | Same as above (217 ft). | | | |
| | | | | | | | Bentonite Seal | |
| 225 | | | | | Same as above (217 ft); predominantly pumice. | | | |
| 230 | | | | | Same as above (217 ft); pumice and lithics. | SW | | |
| 235 | | | | | Same as above (217 ft); trace fine gravel to 2.7cm. | | | |
| | | | | | | | Top of Filter Pack | Bottom of casing @ 1312. Resumed drilling @ 1319. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106119

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/3/2011
Date TD Reached: 3/4/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473521.57
X Coordinate: 1541613.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; medium dense; 100% very fine to very coarse sand; trace fine gravel to 1cm; rounded; grading coarser than 235'. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 245 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; medium dense; 85% medium sand; 15% fine sand; trace fine gravel to 1.5cm; rounded. | | | |
| | | SB0166 | 2.7 | | | | | Blow counts (247-248.5'): 14/23. |
| 250 | | | | | Same as above (244 ft); dense; 85% coarse sand; 15% fine to medium sand. | SP | Bottom of Screen | |
| 255 | | | | | Same as above (244 ft); 85% coarse sand; 15% fine to medium sand. | | | Resumed drilling @ 1345. |
| 260 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; medium dense; 100% very fine to very coarse sand to 5mm; subrounded. | SW | Bentonite Seal | |
| 265 | | | | | Well graded SAND with Silt (SW-SM); dark yellowish brown (10YR 4/4); moist; dense; 90% fine to coarse sand to 3mm; rounded; 10% silt. | SW-SM | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106119

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/3/2011
Date TD Reached: 3/4/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473521.57
X Coordinate: 1541613.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% very fine to very coarse sand; trace fine gravel to 6mm; subrounded. | SW | | |
| 275 | | | | | Lean CLAY (CL); brown (10YR 5/3); moist; very stiff; medium plasticity; 95% clay; 5% silt. | CL | | Bottom of casing @ 1352. |
| 280 | | | | | Same as above (275 ft). | CL | | |
| 285 | | | | | Lean CLAY with Sand (CL); brown (10YR 5/3); moist; very stiff; medium plasticity; 75% clay; 25% very fine to medium sand to 1mm. | CL | Bentonite Seal | |
| 290 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; dense; 100% very fine to very coarse sand; trace fine gravel to 1.3cm; rounded. | SW | | |
| 295 | | | | | Well graded SAND with Gravel (SW); dry; dense; 80% very fine to very coarse sand; 20% fine gravel to 3cm. | SW | | |
| | X | SB0167 | 5.5 | | | | | Blow counts (297-298.5'): 12/27. Bottom of casing @ 1408. Resumed drilling @ 1424. |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106119

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/3/2011
Date TD Reached: 3/4/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473521.57
X Coordinate: 1541613.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | | | | |
| | | | | | Silty SAND (SM); dark yellowish brown (10YR 4/4); moist; dense; 80% very fine to very coarse sand to 4mm; rounded; 20% silt. | SM | | |
| 305 | | | | | | | | |
| | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% very fine to very coarse sand; 5% fine gravel to 1.3cm; rounded; 5% silt. | | | |
| 310 | | | | | Same as above (305 ft). | SW | | |
| 315 | | | | | Same as above (305 ft). | | Bentonite Seal | Resumed drilling @ 1433. |
| 320 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; loose; 90% medium sand; 10% fine gravel to 3.5 cm; well rounded. | | | |
| 325 | | | | | Same as above (320 ft); no gravel. | SP | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106119

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/3/2011
Date TD Reached: 3/4/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473521.57
X Coordinate: 1541613.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; loose; 100% fine to medium sand. | | | |
| 335 | | | | | Same as above (330 ft); 100% medium sand. | SP | Bentonite Seal<br>Top of Filter Pack | Resumed drilling @ 1452. |
| 340 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; loose; 95% very fine to very coarse sand; trace fine gravel to 2cm; rounded; 5% silt. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 345 | | | | | Same as above (340 ft); grading coarser. | | | |
| | | SB0168 | 2.9 | | | | | Blow counts (347-348.5'): 5/10. Resumed drilling @ 1509. |
| 350 | | | | | Same as above (340 ft); medium dense; coarser. | SW | Bottom of Screen | |
| 355 | | | | | Same as above (340 ft); grading finer. | | Bentonite Seal | |
| 360 | | | | | | | | Bottom of casing @ 1513. |

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# Borehole ID: KAFB-106119

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/3/2011
Date TD Reached: 3/4/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473521.57
X Coordinate: 1541613.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; loose; 95% very fine to very coarse sand; trace fine gravel to 2cm; rounded; 5% silt. | | | Resumed drilling @ 1519. |
| 365 | | | | | Same as above (360 ft). | SW | | |
| 370 | | | | | Same as above (360 ft); grading finer. | | Bentonite Seal | |
| 375 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); moist; loose; 90% medium sand; 10% coarse sand; trace fine gravel to 1.4 cm; rounded. | | | Bottom of casing @ 1523. Resumed drilling @ 1530. |
| 380 | | | | | Same as above (375 ft); trace fine gravel to 3cm. | SP | | |
| 385 | | | | | Same as above (375 ft). | | Native Backfill | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106119

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/3/2011
Date TD Reached: 3/4/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473521.57
X Coordinate: 1541613.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); moist; loose; 85% medium sand; 15% coarse sand; trace fine gravel to 1.4 cm; rounded. | SP | | |
| 395 | | | | | Same as above (390 ft); 90% medium sand; 10% coarse sand. | | | |
| | | SB0169 | 0.3 | | Well graded SAND (SW); brown (10YR 4/3); dry; loose; 100% very fine to very coarse sand to 4.5mm; subrounded. | | | Bottom of casing @ 1535. Blow counts (397-398.5'): 5/Not Recorded. Blow counts (398.5-400'): Not Recorded. Resumed drilling @ 1556. |
| 400 | | SB0170 | 3.3 | | Same as above (397 ft). | | | |
| 405 | | | | | Same as above (397 ft); grading finer. | SW | Bentonite Seal | |
| 410 | | | | | Same as above (397 ft); grading finer. | | | |
| 415 | | | | | Same as above (397 ft); grading coarser. | | | Bottom of casing @ 1602. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106119

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/3/2011
Date TD Reached: 3/4/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473521.57
X Coordinate: 1541613.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% medium to coarse sand to 2mm; rounded. | | | |
| 425 | | | | | Same as above (420 ft). | SP | Bentonite Seal | |
| 430 | | | | | Same as above (420 ft). | | | |
| 435 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; dense; 95% very fine to very coarse sand; trace fine gravel to 1.5cm; rounded; 5% silt. | SW | | |
| | | | | | Lean CLAY (CL); lense. | CL | | |
| 440 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; dense; 100% fine sand to 0.2mm; rounded. Note: strong odor from cuttings. | SP | Top of Filter Pack; Top of 3" Schedule 80 PVC 0.050 Slot Screen | Resumed drilling @ 1626. |
| 445 | | | | | Same as above (437 ft); 100% medium sand. | | | |
| | | SB0171 | 0.3 | | | | | Bottom of casing @ 1631. Blow counts (447-448.5'): 10/15. Resumed drilling @ |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106119

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/3/2011
Date TD Reached: 3/4/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473521.57
X Coordinate: 1541613.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; dense; 100% fine sand to 0.2mm; rounded. | SP | Bottom of Screen | 1646. |
| 455 | | | | | Same as above (450 ft). | | Bottom of Filter Pack<br>Native Backfill | |
| 460 | | | | | | | | Total depth = 460 ft. Reached @ 1650 on 3/4/11. |
| 465 | | | | | | | | Water added during drilling (gallons) = 0 |
| | | | | | | | | Water added during construction (gallons) = 320 |
| 470 | | | | | | | | Bottom of casing: TD the joint and ready to make new connection. |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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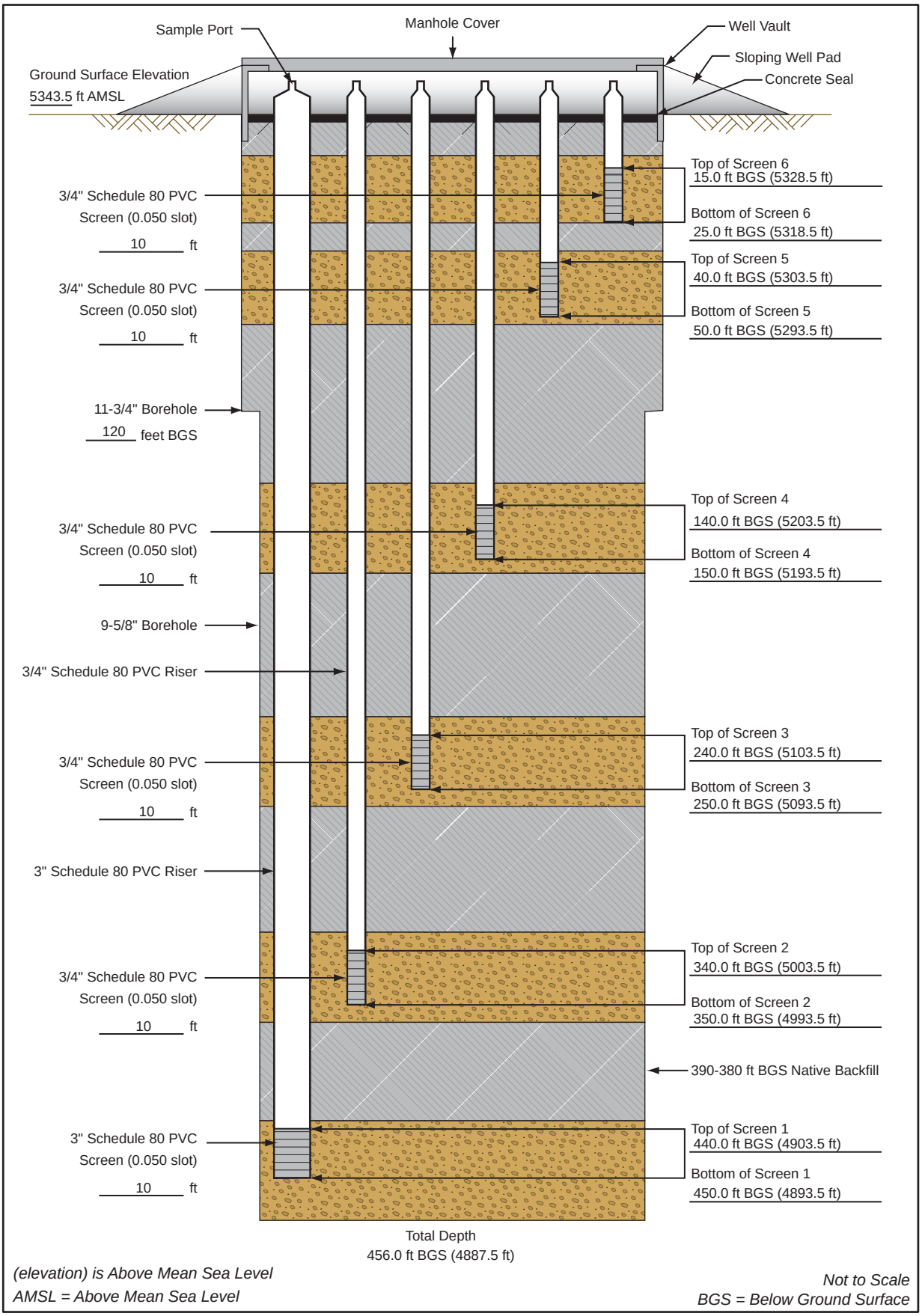
# Nested Soil Vapor Well Completion Diagram for KAFB-106119

Installation Start Date/Time: 3/5/2011 @ 8:00
Installation End Date/Time: 3/6/2011 @ 15:00



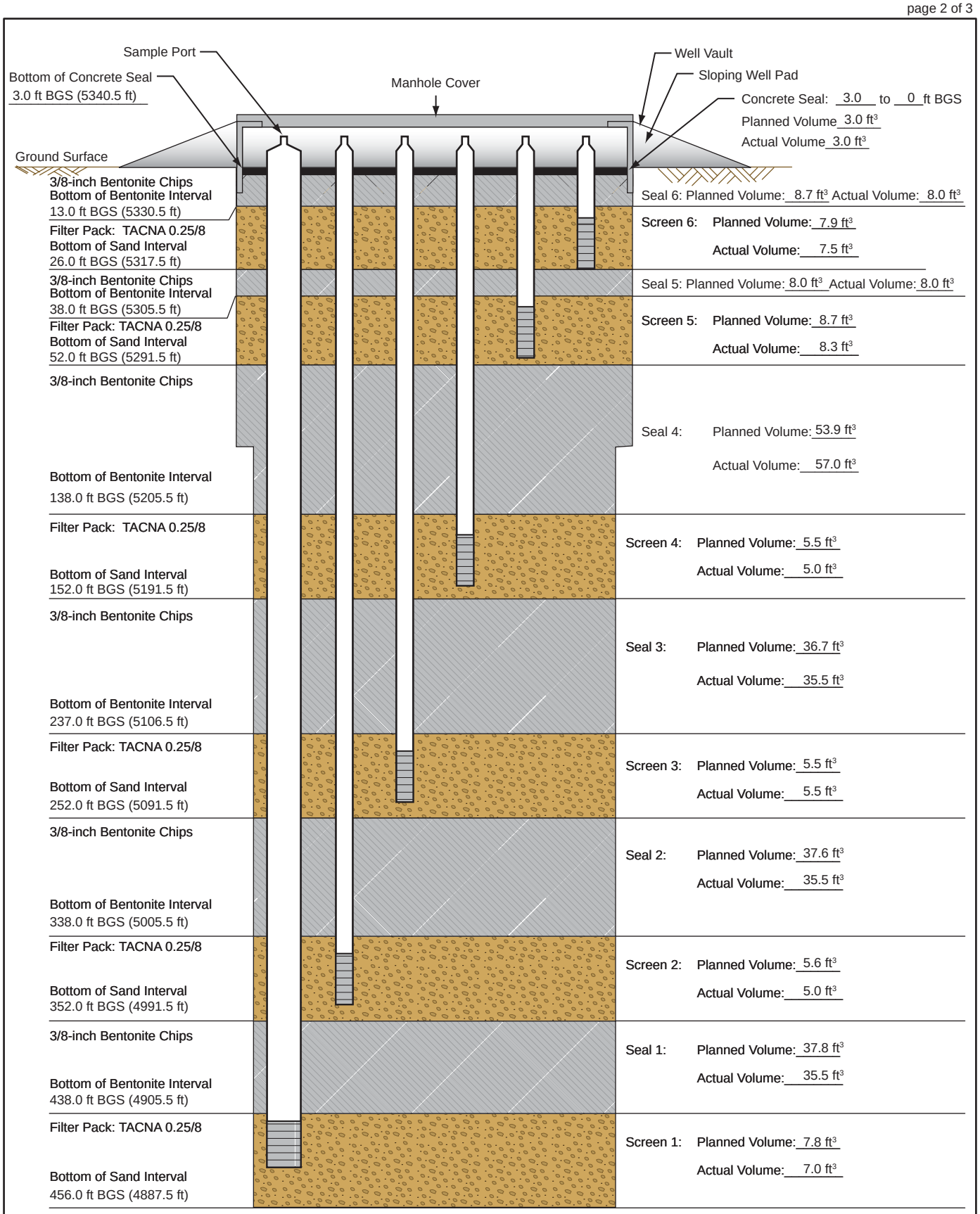



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106119






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

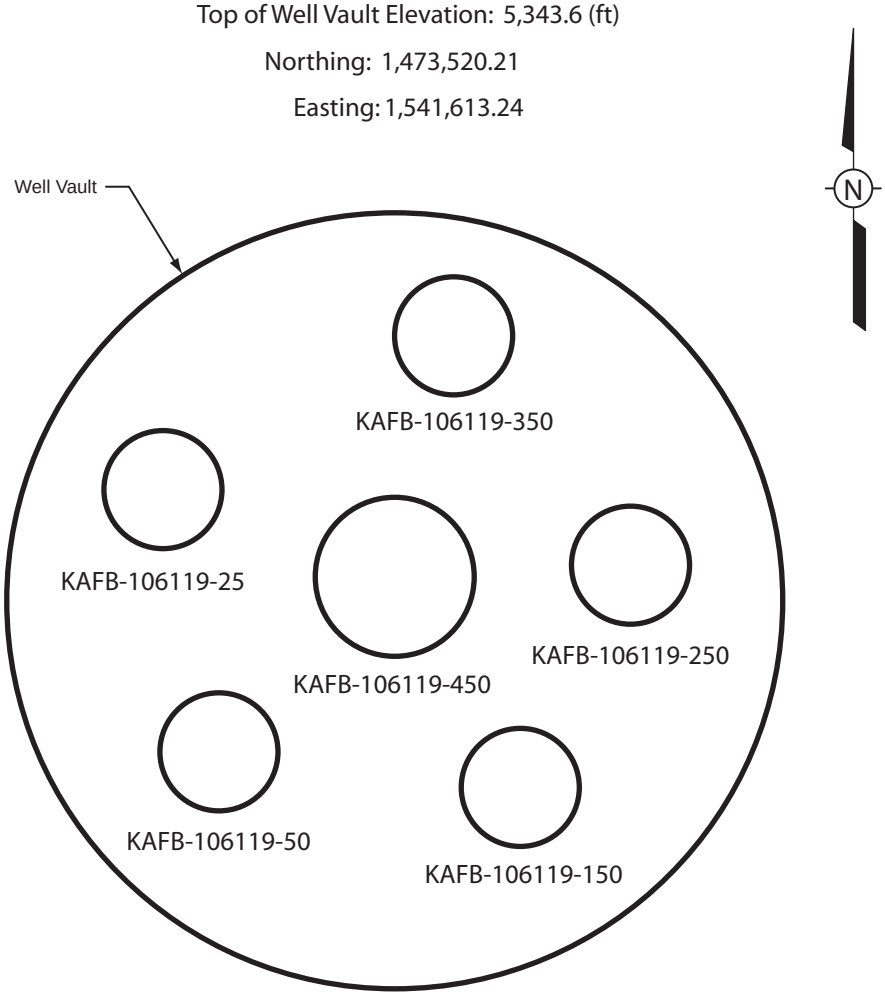
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106119



Top of Well Vault Elevation: 5,343.6 (ft)

Northing: 1,473,520.21

Easting: 1,541,613.24




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106119-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1,473,519.57 | 1,541,613.06 | 5343.2 |
| KAFB-106119-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1,473,519.32 | 1,541,613.23 | 5343.2 |
| KAFB-106119-150 | 3/4 | 150.0 | 140.0 - 150.0 | 1,473,519.41 | 1,541,613.50 | 5343.2 |
| KAFB-106119-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1,473,519.68 | 1,541,613.54 | 5343.2 |
| KAFB-106119-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1,473,519.79 | 1,541,613.27 | 5343.2 |
| KAFB-106119-450 | 3 | 450.0 | 440.0 - 450.0 | 1,473,519.63 | 1,541,613.29 | 5343.2 |

# Borehole ID: KAFB-106120

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/5/2011
Date TD Reached: 6/7/2011
Date Completed: 6/9/2011

Ground Elevation AMSL (ft): 5343.4
Y Coordinate: 1472902.46
X Coordinate: 1542054.23

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Sandy SILT (ML); light brown (7.5YR 6/3); dry; soft; nonplastic; 65% silt; 35% fine to coarse sand; angular to subangular; slight odor. | | Concrete Seal | Hand augered. |
| 5 | | | | | SILT (ML); brown (7.5YR 5/4); dry; soft; nonplastic; 95% silt; 5% fine to coarse sand; very slight odor. | | Bentonite Seal | Began drilling @ 1652 on 6/5/11. |
| | | SB0172 | 0.0 | | | | | Kelly down. End of 6/5/11. Resumed drilling @ 0803 on 6/6/11. Blow counts (7-8.5'): 11/8. |
| 10 | | | | | Same as above (5 ft); low plasticity; trace fine gravel; rounded; caliche coating; no odor. | ML | Top of Filter Pack | |
| 15 | | | | | Same as above (5 ft). | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 0814. New 10' connection @ 0900. Resumed drilling @ 0900. |
| | | SB0173 | 0.0 | | | | | Blow counts (17-18.5'): 50/40. |
| 20 | | SB0173-MS | 0.0 | | | | | Blow counts (18.5-20'): 30/50. |
| | | SB0173-MSD | | | Lean CLAY (CL); light brown (7.5YR 6/4); damp; stiff; medium to high plasticity; 100% clay; trace fine sand; rounded; no odor. | CL | | |
| 25 | | | | | SILT (ML); strong brown (7.5YR 4/6); damp; stiff; medium plasticity; 100% silt; no odor. | | Bottom of Screen | Kelly down @ 0906. New 10' connection @ 0928. Resumed drilling @ 0928. |
| | | SB0174 | 0.0 | | | ML | Bentonite Seal | Blow counts (27-28.5'): 25/40. |
| 30 | | | | | | | | |

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# Borehole ID: KAFB-106120

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/5/2011
Date TD Reached: 6/7/2011
Date Completed: 6/9/2011

Ground Elevation AMSL (ft): 5343.4
Y Coordinate: 1472902.46
X Coordinate: 1542054.23

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); strong brown (7.5YR 4/6); damp; stiff; low to medium plasticity; 100% silt; no odor. | | Bentonite Seal | |
| 35 | | | | | Same as above (30 ft); medium plasticity; trace fine sand. | | Top of Filter Pack | Kelly down @ 0935. New 10' connection @ 1000. Resumed drilling @ 1000. Blow counts (37-38.5'): 35/40. |
| | | SB0175 | 0.0 | | | | | |
| 40 | | | | | SILT (ML); strong brown (7.5YR 4/6); damp; stiff; non to low plasticity; 95% silt; 5% fine to coarse sand; angular; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 45 | | | | | Same as above (40 ft); low plasticity. | ML | | Kelly down @ 1005. New 10' connection @ 1022. Resumed drilling @ 1022. Blow counts (47-48.5'): 30/50. |
| | | SB0176 SB0177 | 0.0 | | | | | |
| 50 | | | | | Same as above (40 ft). | | Bottom of Screen | |
| 55 | | | | | SILT with Sand (ML); strong brown (7.5YR 4/6); damp; stiff; non to low plasticity; 80% silt; 20% fine to coarse sand; subangular; no odor. Note: sand is granitic. | | Bentonite Seal | Kelly down @ 1027. New connection @ 1041. Resumed drilling @ 1041. |
| 60 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 9/27/11 11:51 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106120

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/5/2011
Date TD Reached: 6/7/2011
Date Completed: 6/9/2011

Ground Elevation AMSL (ft): 5343.4
Y Coordinate: 1472902.46
X Coordinate: 1542054.23

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | | | | |
| | | | | | Silty SAND (SM); strong brown (7.5YR 4/6); damp; dense; 60% fine to coarse sand; angular; 10% fine gravel; subangular; 30% silt; no odor. Note: sand is composed of granite. | SM | | |
| 65 | | | | | SILT with Gravel (ML); strong brown (7.5YR 4/6); damp; stiff; nonplastic; 80% silt; 15% fine gravel; angular; 5% fine to coarse sand; no odor. Note: gravel is composed of granite. | | | |
| 70 | | | | | SILT (ML); brown (7.5YR 4/4); damp; stiff; non to low plasticity; 90% silt; 10% fine to coarse sand; angular; trace gravel; no odor. Note: sand is composed of granite. | | | |
| 75 | | | | | Same as above (70 ft); nonplastic; 100% silt. | ML | Bentonite Seal | Kelly down @ 1052. New 20' connection @ 1127. Resumed drilling @ 1127. |
| 80 | | | | | Same as above (70 ft); low plasticity. | | | Cyclone clogged. Took off hose and cleared. |
| 85 | | | | | Same as above (70 ft); nonplastic; 95% silt; 5% fine to coarse sand; angular. | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106120

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/5/2011
Date TD Reached: 6/7/2011
Date Completed: 6/9/2011

Ground Elevation AMSL (ft): 5343.4
Y Coordinate: 1472902.46
X Coordinate: 1542054.23

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); strong brown (7.5YR 5/6); damp; stiff; nonplastic; 100% silt; no odor. | ML | | |
| 95 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; trace gravel; angular; no odor. Note: sand is composed of granite. | SW | | Kelly down @ 1415. New 20' connection @ 1435. Resumed drilling @ 1435. Blow counts (97-98.5'): 35/40. |
| | | SB0178 | 0.0 | | | | | |
| 100 | | | | | Same as above (95 ft); subrounded to rounded sand; abundant tuff grains. | | | |
| 105 | | | | | Same as above (95 ft). | | Bentonite Seal | |
| 110 | | | | | | | | |
| 115 | | | | | SILT (ML); light brown (7.5YR 6/4); damp; soft; nonplastic; 100% silt; trace fine gravel; subrounded. | ML | | |
| | | | | | Same as above (111 ft). | | | Kelly down @ 1442. New 5' connection @ 1452. Resumed drilling @ 1452. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106120

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/5/2011
Date TD Reached: 6/7/2011
Date Completed: 6/9/2011

Ground Elevation AMSL (ft): 5343.4
Y Coordinate: 1472902.46
X Coordinate: 1542054.23

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT (ML); brown (7.5YR 5/4); damp; stiff; medium plasticity; 95% silt; 5% fine to coarse sand; rounded; no odor. | | | Kelly down @ 1457. Total depth with 11-3/4" casing. New connection @ 1626. Resumed drilling with 9-5/8" casing @ 1628. |
| 125 | | | | | Same as above (120 ft); medium plasticity; 100% silt. | | Bentonite Seal | |
| 130 | | | | | Same as above (120 ft). | ML | | |
| 135 | | | | | SILT (ML); light brown (7.5YR 6/4); damp; stiff; nonplastic; 100% silt; trace clay nodules; no odor. | | Top of Filter Pack | Kelly down @ 1637. New 10' connection @ 1644. Resumed drilling @ 1644. |
| 140 | | | | | Well graded SAND (SW); brown (10YR 5/4); dry; dense; 100% fine to coarse sand; subrounded to rounded; trace fine gravel; no odor. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 145 | | | | | SILT (ML); brown (7.5YR 4/3); damp; stiff; low plasticity; 100% silt; no odor. | ML | | Kelly down @ 1646. New 10' connection @ 1702. Resumed drilling @ 1702. Blow counts (147-148.5'): 40/50. |
| | X | SB0179 | 0.0 | | | | | |
| 150 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 9/27/11 11:51 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106120

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/5/2011
Date TD Reached: 6/7/2011
Date Completed: 6/9/2011

Ground Elevation AMSL (ft): 5343.4
Y Coordinate: 1472902.46
X Coordinate: 1542054.23

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | SILT (ML); brown (7.5YR 4/3); damp; stiff; non to low plasticity; 100% silt; trace fine gravel; rounded; no odor. | ML | Bottom of Screen | |
| 155 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; no odor. | | | Kelly down @ 1706. New 20' connection @ 1711. Resumed drilling @ 1711. |
| 160 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); damp; dense; 70% fine to coarse sand; subrounded; 30% fine gravel; rounded; no odor. | | | |
| 165 | | | | | Same as above (160 ft). | SW | Bentonite Seal | |
| 170 | | | | | Well graded SAND (SW); brown (10YR 5/3); damp; dense; 90% fine to coarse sand; rounded; 10% fine gravel; subrounded; no odor. | | | |
| 175 | | | | | Same as above (170 ft); abundant tuff grains. | | | Kelly down @ 1715. New 20' connection @ 1720. End of 6/6/11. Resumed drilling @ 0742 on 6/7/11. |
| 180 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 9/27/11 11:51 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106120

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/5/2011
Date TD Reached: 6/7/2011
Date Completed: 6/9/2011

Ground Elevation AMSL (ft): 5343.4
Y Coordinate: 1472902.46
X Coordinate: 1542054.23

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; dense; 95% fine to medium sand; rounded; 5% coarse sand; rounded; no odor. | SP | | |
| 185 | | | | | Well graded SAND (SW); brown (10YR 5/3); damp; dense; 100% fine to coarse sand; subrounded to rounded; no odor. | | | |
| 190 | | | | | Same as above (185 ft). | SW | | |
| 195 | | | | | Same as above (185 ft); trace gravel to 1cm. | | Bentonite Seal | Kelly down @ 0747. New 20' connection @ 0823. Resumed drilling @ 0823. Blow counts (197-198.5'): 40/50. |
| | | SB0180 | 0.0 | | | | | |
| 200 | | | | | SILT (ML); brown (7.5YR 5/4); damp; stiff; nonplastic; 100% silt; no odor. | ML | | |
| 205 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; dense; 100% fine to medium sand; subangular to subrounded; no odor. | SP | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106120

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/5/2011
Date TD Reached: 6/7/2011
Date Completed: 6/9/2011

Ground Elevation AMSL (ft): 5343.4
Y Coordinate: 1472902.46
X Coordinate: 1542054.23

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); damp; dense; 75% fine to coarse sand; subrounded; 25% fine gravel to 1cm; rounded; no odor. | | | |
| 215 | | | | | Same as above (210 ft); 60% fine to coarse sand; subrounded; 40% gravel to 4.5cm; rounded; no odor. | | | Kelly down @ 0829. New 20' connection @ 0838. Resumed drilling @ 0839. |
| 220 | | | | | Same as above (210 ft). | SW | | |
| 225 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 95% fine to coarse sand with abundant tuff; rounded; 5% fine gravel to 2cm; rounded; no odor. | | Bentonite Seal | |
| 230 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; dense; 100% fine to medium sand; rounded; no odor. | SP | | |
| 235 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); dry; dense; 100% fine to coarse sand with abundant tuff; rounded; no odor. | SW | Top of Filter Pack | Kelly down and new 10' connection @ 0845. Resumed drilling @ 0852. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106120

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/5/2011
Date TD Reached: 6/7/2011
Date Completed: 6/9/2011

Ground Elevation AMSL (ft): 5343.4
Y Coordinate: 1472902.46
X Coordinate: 1542054.23

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; rounded; abundant tuff grains; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 245 | | | | | Same as above (240 ft). | SW | | Kelly down @ 0858. New 10' connection @ 0918. Resumed drilling @ 0918. Blow counts (247-248.5'): 35/45. |
| | | SB0181 | 0.0 | | | | | |
| 250 | | | | | SILT (ML); light brown (7.5YR 6/4); damp; stiff; medium plasticity; 100% silt; no odor. | | Bottom of Screen | |
| 255 | | | | | SILT (ML); light olive brown (2.5Y 5/3); moist; stiff; nonplastic; 100% silt; no odor. | ML | | Kelly down @ 0923. New 20' connection @ 0930. Resumed drilling @ 0930. |
| 260 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 100% fine to coarse sand; rounded; abundant tuff grains; no odor. | | Bentonite Seal | |
| 265 | | | | | Same as above (260 ft). | SW | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106120

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/5/2011
Date TD Reached: 6/7/2011
Date Completed: 6/9/2011

Ground Elevation AMSL (ft): 5343.4
Y Coordinate: 1472902.46
X Coordinate: 1542054.23

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 95% fine to coarse sand; subrounded to rounded; 5% fine gravel to 1cm; subangular; no odor. | | | |
| 275 | | | | | Same as above (270 ft). | SW | | Kelly down @ 0938. New 20' connection @ 0945. Resumed drilling @ 0945. |
| 280 | | | | | Lean CLAY (CL); brown (7.5YR 5/3); damp; stiff; medium plasticity; 100% clay; no odor. | CL | | |
| 285 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; no odor. | SP | Bentonite Seal | |
| 290 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subrounded; 5% fine gravel to 1cm; subrounded; no odor. | | | |
| 295 | | | | | Same as above (290 ft). | SW | | Kelly down @ 0958. New 20' connection @ 1023. Resumed drilling @ 1024. |
| | X | SB0182 | 0.0 | | | | | Blow counts (297-298.5'): 40/50. |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106120

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/5/2011
Date TD Reached: 6/7/2011
Date Completed: 6/9/2011

Ground Elevation AMSL (ft): 5343.4
Y Coordinate: 1472902.46
X Coordinate: 1542054.23

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% fine to coarse sand; rounded; 10% fine gravel to 2cm; rounded; no odor. | | | |
| 305 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 75% fine to coarse sand; subrounded; 25% fine gravel to 2cm; rounded; moderate clay coating on gravel. | SW | | |
| 310 | | | | | Same as above (305 ft). | | | |
| 315 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 60% fine gravel to 3cm; rounded; 40% fine to coarse sand; subangular; no odor. Note: gravel is composed of basalt. | GP | Bentonite Seal | Kelly down @ 1034. New 20' connection @ 1041. Resumed drilling @ 1042. |
| 320 | | | | | Well graded GRAVEL (GW); brown (10YR 4/3); dry; very dense; 90% fine to coarse gravel to 5cm; rounded; 10% fine to medium sand; no odor. Note: gravel is composed of basalt. | GW | | |
| 325 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; rounded; 5% fine gravel to 2cm; no odor. | SW | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 9/27/11 11:51 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106120

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/5/2011
Date TD Reached: 6/7/2011
Date Completed: 6/9/2011

Ground Elevation AMSL (ft): 5343.4
Y Coordinate: 1472902.46
X Coordinate: 1542054.23

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 80% fine to coarse sand; subrounded; 20% fine gravel; subrounded; clay coating on gravel; no odor. | | Bentonite Seal | |
| 335 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 95% fine to coarse sand; subangular to subrounded; 5% fine gravel to 2cm; angular; no odor. | SW | Top of Filter Pack | Kelly down @ 1052. New 10' connection @ 1058. Resumed drilling @ 1058. |
| 340 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; subangular; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 345 | | | | | Same as above (340 ft); 95% fine to medium sand; subangular; 5% fine gravel; subrounded; no odor. | SP | | Kelly down @ 1104. New 10' connection @ 1128. Resumed drilling @ 1128. Blow counts (347-348.5'): 33/50. |
| | | SB0183 | 0.0 | | | | | |
| 350 | | | | | Same as above (340 ft). | | Bottom of Screen | |
| 355 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 75% fine gravel to 2cm; rounded; 25% fine to coarse sand; subangular; no odor. Note: gravel is composed of basalt. | GP | Bentonite Seal | Kelly down @ 1135. New 20' connection @ 1142. Resumed drilling @ 1142. |
| 360 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 9/27/11 11:51 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106120

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/5/2011
Date TD Reached: 6/7/2011
Date Completed: 6/9/2011

Ground Elevation AMSL (ft): 5343.4
Y Coordinate: 1472902.46
X Coordinate: 1542054.23

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 75% fine gravel to 2cm; rounded; 25% fine to coarse sand; no odor. Note: gravel is composed of basalt. | | | |
| 365 | | | | | Same as above (360 ft); 60% fine gravel; 40% fine to coarse sand. | GP | | |
| 370 | | | | | Silty GRAVEL (GM); olive (2.5Y 5/3); damp; dense; 80% fine gravel to 4cm; rounded; 20% silt; no odor. Note: gravel is composed of basalt. | GM | | |
| 375 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); damp; dense; 70% fine to coarse sand; subrounded; 30% fine gravel to 3cm; rounded; no odor. | | Bentonite Seal | Kelly down @ 1157. New 20' connection @ 1205. Resumed drilling @ 1205. |
| 380 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% fine to coarse sand; rounded; 10% fine gravel to 1cm; rounded; no odor. | SW | | |
| 385 | | | | | Same as above (380 ft); 95% fine to coarse sand; 5% fine gravel to 1cm. | | | |
| 390 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 9/27/11 11:51 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106120

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/5/2011
Date TD Reached: 6/7/2011
Date Completed: 6/9/2011

Ground Elevation AMSL (ft): 5343.4
Y Coordinate: 1472902.46
X Coordinate: 1542054.23

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; rounded; trace gravel; subrounded; no odor. | SP | | |
| 395 | | | | | Silty SAND (SM); yellowish brown (10YR 5/4); dry; dense; 85% fine sand; rounded; 15% silt; no odor. | SM | | Kelly down @ 1216. New 20' connection @ 1340. Resumed drilling @ 1340. Blow counts (397-398.5'): 50/50. |
| | | SB0184 | 0.0 | | | | | |
| 400 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded. | SW | Bentonite Seal | |
| 405 | | | | | Same as above (400 ft); grading finer. | | | |
| 410 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine sand; trace medium sand; no odor. | SP | | |
| 415 | | | | | Same as above (410 ft). | | | Kelly down @ 1355. New 20' connection @ 1403. Resumed drilling @ 1403. |
| 420 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 9/27/11 11:51 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106120

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/5/2011
Date TD Reached: 6/7/2011
Date Completed: 6/9/2011

Ground Elevation AMSL (ft): 5343.4
Y Coordinate: 1472902.46
X Coordinate: 1542054.23

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | | | |
| 425 | | | | | Same as above (420 ft); grading finer. | | Bentonite Seal | |
| 430 | | | | | Same as above (420 ft); 90% fine to coarse sand; rounded; 10% fine gravel; subangular. | SW | Top of Filter Pack | |
| 435 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 85% fine to coarse sand; subrounded; 15% fine gravel to 2cm; rounded. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1415. New connection @ 1454. Resumed drilling @ 1454. |
| 440 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subangular; no odor. | | | |
| 445 | | | | | Same as above (440 ft). | | Bottom of Screen | |
| | | SB0185 | NR | | Gravelly SILT (ML); light olive brown (2.5Y 5/3); damp; stiff; nonplastic; 55% silt; 45% fine gravel to 3.5cm; rounded; silt coating on gravel; no odor. | ML | | Blow counts (447-448.5'): 50/refusal. Total depth = 447.5 ft. Reached @ 1505 on |
| 450 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 9/27/11 11:52 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106120

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/5/2011
Date TD Reached: 6/7/2011
Date Completed: 6/9/2011

Ground Elevation AMSL (ft): 5343.4
Y Coordinate: 1472902.46
X Coordinate: 1542054.23

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | 6/7/11. |
| | | | | | | | | Insufficient volume recovered for headspace measurement for SB0185. |
| 455 | | | | | | | | Water added during drilling (gallons) = 0 |
| | | | | | | | | Water added after drilling (gallons) = 0 |
| 460 | | | | | | | | Water added during construction (gallons) = Not recorded. |
| 465 | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 470 | | | | | | | | |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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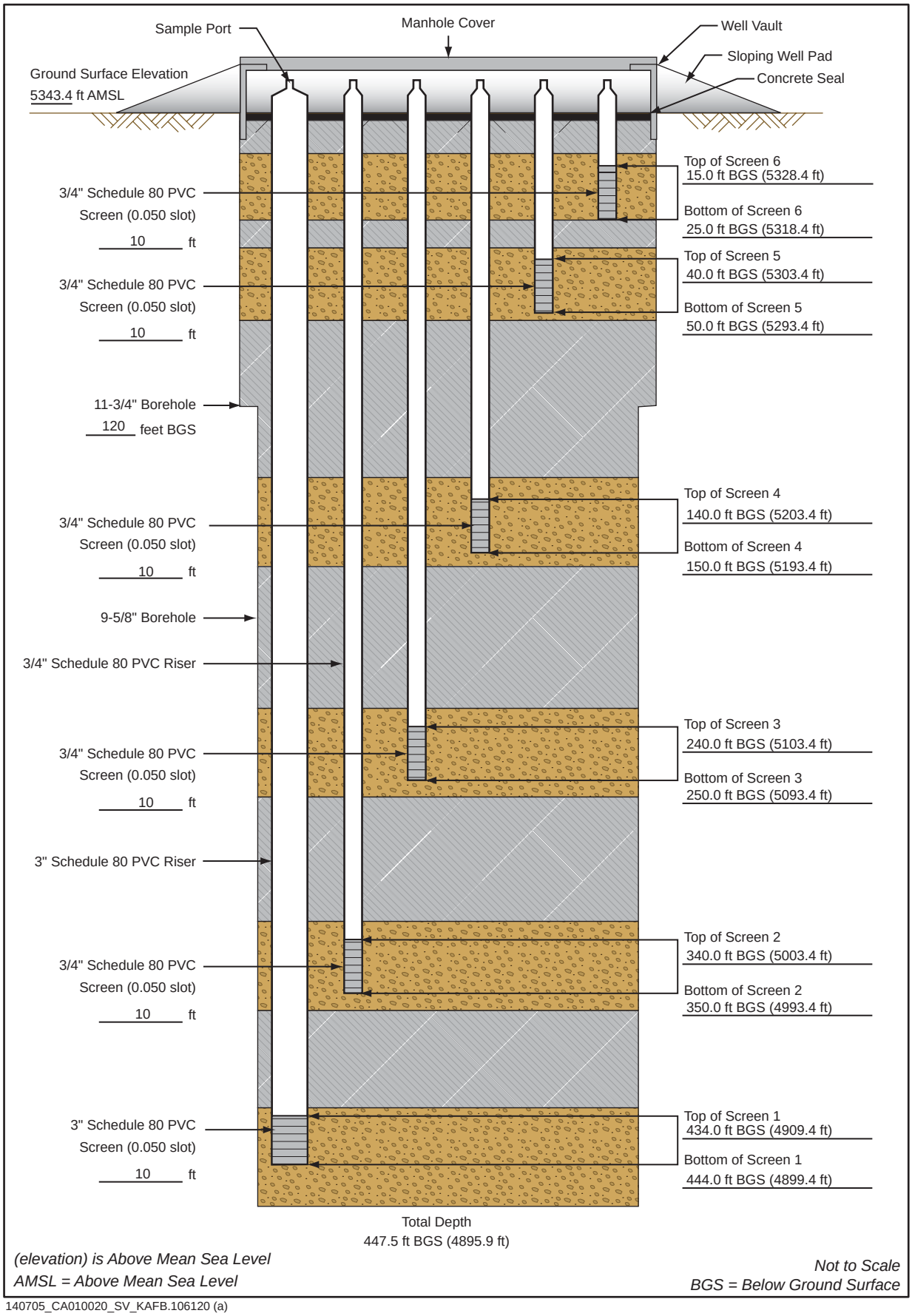
# Nested Soil Vapor Well Completion Diagram for KAFB-106120

Installation Start Date/Time: 6/8/2011 @ 08:00
Installation End Date/Time: 6/9/2011 @ 15:30



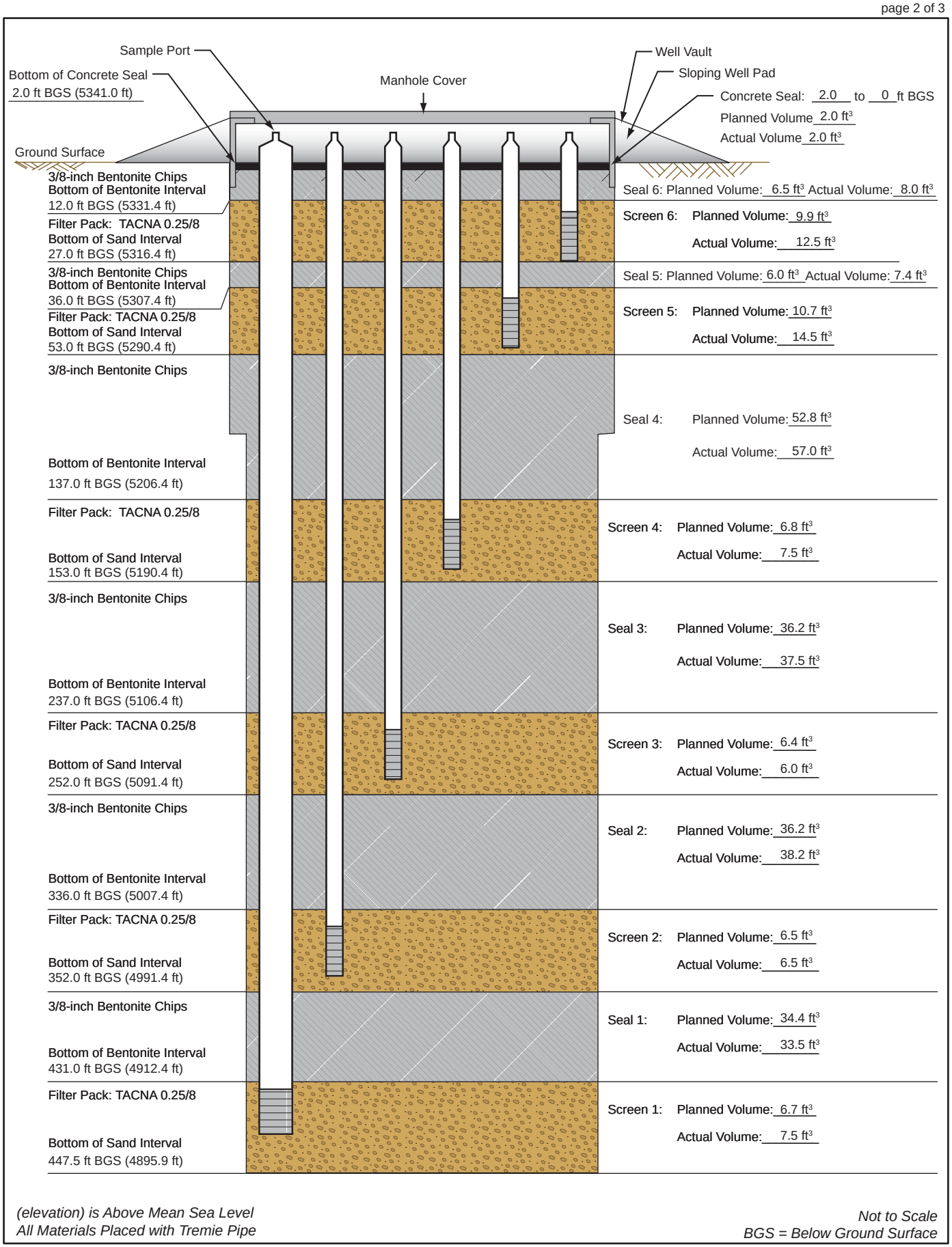



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106120






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

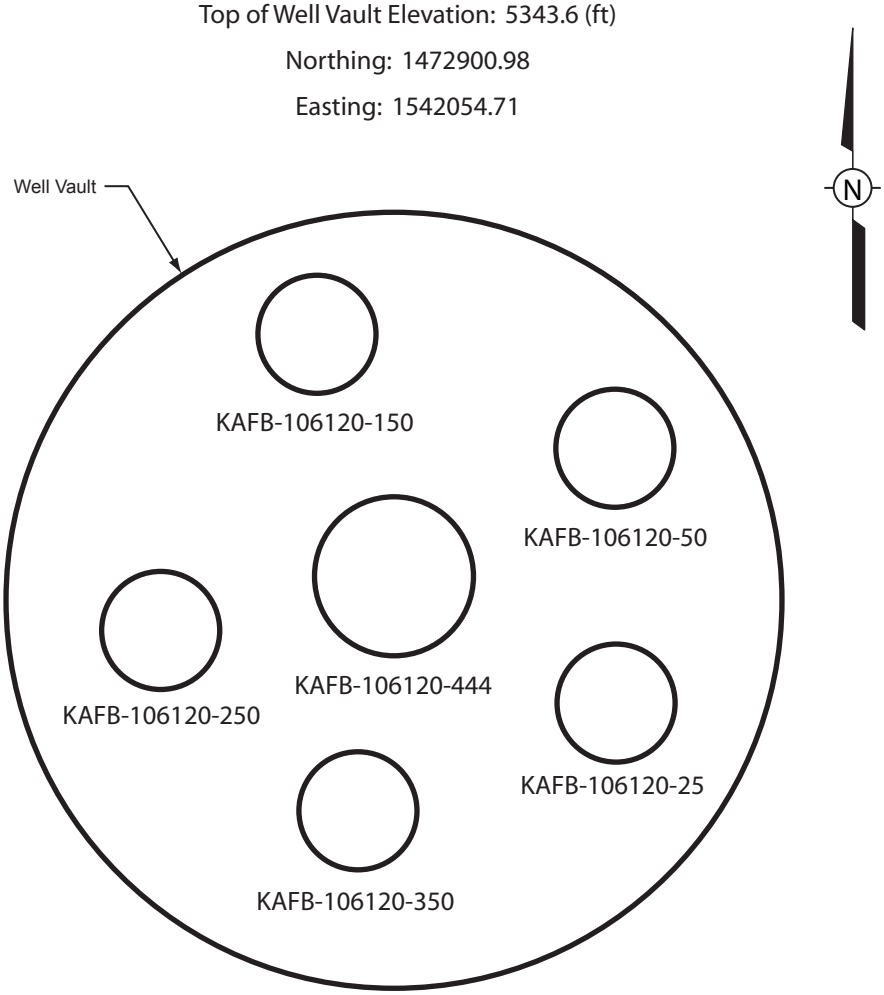
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106120



Top of Well Vault Elevation: 5343.6 (ft)

Northing: 1472900.98

Easting: 1542054.71




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106120-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1472900.30 | 1542054.98 | 5343.1 |
| KAFB-106120-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1472900.49 | 1542055.08 | 5343.1 |
| KAFB-106120-150 | 3/4 | 150.0 | 140.0 - 150.0 | 1472900.74 | 1542054.96 | 5343.1 |
| KAFB-106120-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1472900.51 | 1542054.63 | 5343.1 |
| KAFB-106120-350 | 3/4 | 340.0 | 340.0 - 350.0 | 1472900.28 | 1542054.80 | 5343.1 |
| KAFB-106120-444 | 3 | 444.0 | 434.0 - 444.0 | 1472900.63 | 1542054.86 | 5343.1 |

# Borehole ID: KAFB-106121

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/19/2011
Date TD Reached: 5/22/2011
Date Completed: 5/25/2011

Ground Elevation AMSL (ft): 5343.7
Y Coordinate: 1472807.39
X Coordinate: 1542051.35

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Silty SAND with Gravel (SM); light brown (7.5YR 6/4); moist; 60% very fine sand; rounded; 20% gravel to 0.5in; rounded; 20% silt with clay nodules; soft to stiff; low plasticity; no odor. Note: gravel is metamorphic and pumice. | SM | Concrete Seal | Hand augured. |
| 5 | | | | | Same as above (0 ft). | | Bentonite Seal | Began drilling @ 0855 on 5/19/11. |
| 10 | | SB0186 | 0.2 | | Silty SAND with Gravel (SM); brown (7.5YR 5/4); moist; 50% very fine sand; rounded; 20% gravel to 0.25in; rounded; 30% silt with clay nodules; soft; medium plasticity; no odor. Note: contains pumice fragments. | | | Blow counts (9.5-11'): 10/7/6. Blow counts (11-12.5'): Not recorded. |
| | | SB0186 | | | | | Top of Filter Pack | |
| 15 | | | | | Lean CLAY (CL); brown (7.5YR 5/4); moist; medium stiff; medium plasticity; 100% clay nodules; trace coarse sand and pumice; subrounded; slight sweet odor. | CL | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 20 | | SB0187 | 0.0 | | Well graded SAND with Clay and Gravel (SW-SC); brown (7.5YR 4/4); moist; 60% fine to coarse sand; subangular to rounded; 30% gravel to 0.75in; angular to subangular; 10% clay nodules; no odor. Note: gravel is composed of granite. | SW-SC | | Blow counts (18-19.5'): 50/65/30. |
| 25 | | | | | Gravelly SILT (ML); reddish brown (2.5YR 4/4); moist; 65% silt; 25% gravel to 0.125in; subangular to subrounded; 10% coarse sand; subangular to subrounded; no odor. Note: gravel is metamorphic. | ML | Bottom of Screen | |
| 30 | | SB0188 | 0.0 | | SILT (ML); light brown (7.5YR 6/4); moist; 100% silt; no odor. | | Bentonite Seal | Blow counts (28-29.5'): 25/60/30. |

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# Borehole ID: KAFB-106121

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/19/2011
Date TD Reached: 5/22/2011
Date Completed: 5/25/2011

Ground Elevation AMSL (ft): 5343.7
Y Coordinate: 1472807.39
X Coordinate: 1542051.35

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT with Gravel (ML); light brown (7.5YR 6/3); dry; 80% silt; 15% gravel to 0.25in; subrounded to rounded; 5% coarse sand with pumice; no odor. | | Bentonite Seal | New 10' connection @ 1140. |
| 35 | | | | | Same as above (30 ft). | | Top of Filter Pack | |
| 40 | | SB0189 | 0.0 | | SILT (ML); yellowish red (5YR 5/6); dry; 100% silt; trace coarse sand; subangular; no odor. | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Blow counts (38-39.5'): 30/55/60. |
| | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; stiff; low plasticity; 40% silt; 40% clay nodules; 20% coarse sand; subangular to subrounded; no odor. | | | New connection @ 1320. Driller added water to cyclone for dust suppression @ 1330. |
| 45 | | | | | Same as above (40 ft). | | | |
| 50 | | SB0190 | 0.0 | | Lean CLAY (CL); brown (7.5YR 5/4); dry; very stiff; low plasticity; 70% clay; 30% silt; no odor. | CL | Bottom of Screen | Blow counts (48-49.5'): 40/60/50. Blow counts (49.5-51'): 50/60/70. |
| | | SB0190-MS | 0.0 | | Same as above (48.5 ft); trace pumice fragments and granitic gravel to 0.125in. | | | Blow counts (51-52.5'): Not recorded. |
| | | SB0190-MSD | 0.0 | | Lean CLAY (CL); strong brown (7.5YR 4/6); wet; soft; high plasticity; 80% clay; 20% silt; no odor. | | | Sand line broke, split spoon stuck @ 1435. End of 5/19/11. |
| 55 | | | | | SILT (ML); strong brown (7.5YR 5/6); moist; 90% silt; 10% medium to coarse sand with pumice fragments; subangular to subrounded; no odor. | ML | Bentonite Seal | Started retrieving split spoon sampler @ 0740 on 5/20/11. Recovered sampler @ 1700. End of 5/20/11. New connection and resumed drilling @ 0810 on 5/21/11. |
| 60 | | | | | Well graded SAND with Gravel (SW); brown (7.5YR 5/4); dry; 80% fine to coarse sand; angular to rounded; 20% gravel to 0.125in; angular to subangular; no odor. Note: gravel is composed of | SW | | |

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# Borehole ID: KAFB-106121

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/19/2011
Date TD Reached: 5/22/2011
Date Completed: 5/25/2011

Ground Elevation AMSL (ft): 5343.7
Y Coordinate: 1472807.39
X Coordinate: 1542051.35

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | granite. | | | Driller added water to cyclone for dust suppression. |
| | | | | | SILT with Gravel (ML); reddish brown (5YR 4/4); wet; soft; medium plasticity; 50% silt; 20% clay; 15% gravel to 1.5in; angular to subangular; 5% fine to coarse sand; subangular to subrounded; no odor. Note: gravel is granite and metamorphic. | ML | | |
| 65 | | | | | Silty SAND (SM); strong brown (7.5YR 4/6); moist; 80% fine to coarse sand; subangular to rounded; trace gravel to 0.125in; 20% silt; trace clay; no odor. | SM | | |
| 70 | | | | | Lean CLAY (CL); yellowish red (5YR 4/6); wet; soft; medium to high plastcity; 70% clay; 25% silt; 5% gravel to 0.75in; subangular to subrounded; no odor. | CL | | |
| 75 | | | | | Poorly graded SAND with Clay (SP-SC); light brown (7.5YR 6/4); dry; 90% very fine to fine sand; trace medium to coarse sand; 10% clay nodules; stiff; low plasticity; no odor. | SP-SC | Bentonite Seal | New connection @ 0925. |
| 80 | | | | | Lean CLAY (CL); reddish brown (5YR 5/4); moist; soft; high plasticity; 75% clay; 20% silt; 5% gravel to 0.75in; angular to subangular; no odor. Note: gravel is metamorphic and pumice fragments. | | | |
| 85 | | | | | Lean CLAY (CL); yellowish red (5YR 5/6); dry; stiff; low plasticity; 70% clay nodules; 25% silt; 5% gravel to 0.75in; angular to subangular; no odor. | CL | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106121

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/19/2011
Date TD Reached: 5/22/2011
Date Completed: 5/25/2011

Ground Elevation AMSL (ft): 5343.7
Y Coordinate: 1472807.39
X Coordinate: 1542051.35

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Lean CLAY with Gravel (CL); reddish brown (5YR 4/4); moist; stiff; low plasticity; 80% clay nodules; 20% gravel to 0.5in; subangular to rounded; no odor. Note: gravel is granite and pumice fragments. | CL | | Driller continued adding water to cyclone for dust suprression. |
| 95 | | SB0191 | 0.0 | | Same as above (90 ft). | | | Blow counts (95-96.5'): 50/30/40. |
| 100 | | | | | Lean CLAY (CL); yellowish red (5YR 4/6); moist; very stiff; low plasticity; 100% clay; no odor. | | | |
| | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); wet; 100% fine to medium sand; subrounded to rounded; no odor. | SP | | New 20' connection @ 1020. Discharge line clogged with clay @ 1040. Resumed drilling @ 1100. |
| 105 | | | | | Well graded SAND with Gravel (SW); yellowish brown (10YR 5/4); dry; 80% fine to coarse sand with pumice; subangular to rounded; 15% gravel to 0.25in; angular to subrounded; 5% clay; no odor. Note: gravel is granite and metamorphic. | SW | Bentonite Seal | |
| 110 | | | | | SILT (ML); yellowish brown (10YR 5/8); moist; 100% silt; no odor. | | | |
| 115 | | | | | SILT (ML); yellowish brown (10YR 5/6); moist; 100% silt; no odor. | ML | | |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106121

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/19/2011
Date TD Reached: 5/22/2011
Date Completed: 5/25/2011

Ground Elevation AMSL (ft): 5343.7
Y Coordinate: 1472807.39
X Coordinate: 1542051.35

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Lean CLAY (CL); strong brown (7.5YR 4/6); moist; soft; medium plasticity; 70% clay; 20% silt; 10% medium to coarse sand; subangular to subrounded; slight sweet odor. | | | Total depth with 11-3/4" casing @ 1145. New connection and resumed drilling with 9-5/8" casing @ 1400. Driller continued adding water to cyclone. |
| 125 | | | | | Lean CLAY (CL); strong brown (7.5YR 4/6); moist; soft; low to medium plasticity; 100% clay nodules; slight sweet odor. | CL | Bentonite Seal | |
| 130 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); moist; 100% very fine to fine sand; trace medium sand; subrounded to rounded; slight sweet odor. | | Top of Filter Pack | |
| 135 | | | | | Poorly graded SAND with Gravel (SP); yellowish brown (10YR 5/4); dry; 50% fine to coarse sand (mostly fine sand); subangular to rounded; 50% gravel to 1.5in; angular to subrounded; trace clay; slight sweet odor. Note: gravel is metamorphic and limestone. | SP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | New connection @ 1420. Driller stopped adding water to cyclone. |
| 140 | | | | | Well graded SAND with Gravel (SW); pale brown (10YR 6/3); moist; 80% fine to coarse sand; subangular to rounded; 20% gravel to 2in; subrounded to rounded; slight sweet odor. Note: abundant pumice fragments present and gravel is metamorphic. | SW | | |
| 145 | | | | | Same as above (140 ft). | | Bottom of Screen | |
| 150 | | SB0192 | 0.0 | | Lean CLAY (CL); strong brown (7.5YR 5/6); moist; stiff; low to medium plasticity; | CL | Bentonite Seal | Blow counts (148.5-150'): 66/40/30. |

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# Borehole ID: KAFB-106121

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/19/2011
Date TD Reached: 5/22/2011
Date Completed: 5/25/2011

Ground Elevation AMSL (ft): 5343.7
Y Coordinate: 1472807.39
X Coordinate: 1542051.35

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | 60% clay; 40% silt; slight sweet odor. Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; 90% fine sand; trace medium to coarse sand with pumice; 10% gravel to 0.25in; subangular to subrounded; no odor. | SP | | New connection @ 1520. Driller added water to cyclone for dust supression. |
| 155 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); dry; 75% fine to coarse sand; subangular to rounded; 25% gravel to 0.25in; subangular to subrounded; trace clay nodules; trace pumice fragments; slight sweet odor. Note: gravel is granite and metamorphic. Same as above (155 ft); 60% sand; 40% gravel; subangular to rounded; no clay. | SW | | New 20' connection @ 1540. |
| 160 | | | | | | | | |
| 165 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; 80% fine sand; 20% medium to coarse sand; subrounded to rounded; trace gravel; slight sweet odor. | SP | Bentonite Seal | |
| 170 | | | | | Clayey SAND (SC); yellowish brown (10YR 5/4); dry; 80% fine sand; 5% gravel to 0.25in; 15% clay nodules; soft; low plasticity; slight sweet odor. | SC | | |
| 175 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; 80% fine sand; 20% medium sand; subrounded to rounded; trace pumice; no odor. | SP | | New connection @ 1600. |
| 180 | | | | | | | Native Backfill | |

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# Borehole ID: KAFB-106121

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/19/2011
Date TD Reached: 5/22/2011
Date Completed: 5/25/2011

Ground Elevation AMSL (ft): 5343.7
Y Coordinate: 1472807.39
X Coordinate: 1542051.35

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND with Clay (SW-SC); dark yellowish brown (10YR 4/4); dry; 90% fine to coarse sand; subangular to rounded; 10% clay nodules; stiff; low plasticity; no odor. | SW-SC | | |
| 185 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; 90% fine to coarse sand; 5% gravel to 0.25in; subrounded to rounded; 5% clay nodules; soft to stiff; low plasticity; slight sweet odor. | SW | Native Backfill | |
| 190 | | | | | Well graded SAND with Gravel (SW); yellowish brown (10YR 5/4); moist; 75% fine to coarse sand; subangular to rounded; 20% gravel to 0.5in; angular to subrounded; 5% clay nodules; slight sweet odor. Note: gravel is granite and metamorphic. | | | |
| 195 | | | | | Same as above (190 ft). | | | |
| | | SB0193 SB0194 | 0.0 | | | | | |
| | | | | | Lean CLAY (CL); strong brown (7.5YR 4/6); moist; soft; high plasticity; 100% clay; no odor. | CL | | Blow counts (197-198.5'): 26/30/14. |
| 200 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); dry; 100% fine to coarse sand; subrounded to rounded; no odor. | SW | | New connection @ 1635. |
| 205 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; 80% very fine to fine sand; 20% medium sand; subrounded to rounded; no odor. | SP | Bentonite Seal | |
| 210 | | | | | Gravelly lean CLAY (CL); brown (7.5YR 4/4); moist; soft to stiff; low to medium plasticity; 50% clay nodules; 50% gravel to 1in; subangular to subrounded; slight sweet odor. Note: gravel is granite and metamorphic. | CL | | |

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# Borehole ID: KAFB-106121

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/19/2011
Date TD Reached: 5/22/2011
Date Completed: 5/25/2011

Ground Elevation AMSL (ft): 5343.7
Y Coordinate: 1472807.39
X Coordinate: 1542051.35

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); dry; 80% fine to coarse sand; subangular to rounded; 20% gravel to 0.25in; angular to subangular; slight sweet odor. Note: gravel is granite and metamorphic. | | | |
| 215 | | | | | Same as above (210 ft); moist; 60% sand; 40% gravel to 0.5in; subangular to rounded; no odor. | SW | | New 20' connection @ 1655. |
| 220 | | | | | Same as above (210 ft); pale brown (10YR 6/3); 80% sand; 20% gravel to 0.5in; subrounded to rounded; no odor. Note: gravel is metamorphic. | | Bentonite Seal | |
| 225 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); moist; 100% very fine to fine sand; subrounded to rounded; trace medium sand; trace pumice; slight sweet odor. | SP | | |
| 230 | | | | | Well graded SAND (SW); light gray (10YR 7/2); moist; 100% fine to coarse sand; subrounded to rounded; abundant pumice fragments; slight sweet odor. | SW | | |
| 235 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); moist; 100% fine sand; trace medium sand; subrounded to rounded; no odor. | SP | Top of Filter Pack | New connection @ 1705. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106121

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/19/2011
Date TD Reached: 5/22/2011
Date Completed: 5/25/2011

Ground Elevation AMSL (ft): 5343.7
Y Coordinate: 1472807.39
X Coordinate: 1542051.35

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded GRAVEL (GW); various colors; dry; 100% gravel to 1in; angular to rounded; slight sweet odor. Note: gravel is granite, limestone, and metamorphic. | GW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 245 | | | | | Same as above (240 ft). | | | End of 5/21/11 @ 1710. Resumed drilling @ 0800 on 5/22/11. |
| 250 | | SB0195 | 0.1 | | Lean CLAY (CL); light brown (7.5YR 6/3); moist; soft to medium stiff; low plasticity; 100% clay; no odor. | CL | Bottom of Screen | Blow counts (248.5-250'): 20/30/25. |
| | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); moist; 100% very fine sand; subrounded to rounded; slight sweet odor. | SP | | New connection @ 0825. Resumed drilling @ 0830. |
| 255 | | | | | Clayey SAND (SC); yellowish brown (10YR 5/4); moist; 85% very fine sand; subrounded to rounded; 15% clay; soft; medium plasticity; slight sweet odor. | SC | | New 20' connection @ 0840. |
| 260 | | | | | Same as above (255 ft); strong brown (7.5YR 4/6); slight sweet odor. | | Bentonite Seal | |
| 265 | | | | | Poorly graded SAND with Clay (SP-SC); yellowish brown (10YR 5/6); moist; 90% fine to medium sand; trace coarse sand; subrounded to rounded; 10% clay; soft; low plasticity; slight sweet odor. | SP-SC | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106121

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/19/2011
Date TD Reached: 5/22/2011
Date Completed: 5/25/2011

Ground Elevation AMSL (ft): 5343.7
Y Coordinate: 1472807.39
X Coordinate: 1542051.35

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/8); moist; 100% fine to coarse sand; subangular to rounded; slight sweet odor. | SW | | |
| 275 | | | | | Clayey SAND (SC); brown (7.5YR 4/4); moist; 60% fine to medium sand; subrounded to rounded; 40% clay; soft; medium plasticity; slight sweet odor. | SC | | New connection @ 0900. |
| 280 | | | | | Lean CLAY (CL); brown (7.5YR 5/4): moist; soft; high plasticity; 100% clay nodules; trace coarse sand; no odor. | CL | | |
| 285 | | | | | Poorly graded SAND with Clay (SP-SC); yellowish brown (10YR 5/6); moist; 90% very fine sand; subrounded to rounded; 10% clay; soft; low plasticity; slight sweet odor. | SP-SC | Bentonite Seal | |
| 290 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; 100% fine to coarse sand; subangular to rounded; trace gravel to 0.125in; slight sweet odor. | SW | | |
| 295 | | | | | Same as above (290 ft). | | | |
| 300 | | SB0196 | 0.0 | | Well graded GRAVEL with Sand (GW); various colors; dry; 60% gravel to 1.5in; | GW | | Blow counts (298.5-300'): 15/20/25 |

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# Borehole ID: KAFB-106121

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/19/2011
Date TD Reached: 5/22/2011
Date Completed: 5/25/2011

Ground Elevation AMSL (ft): 5343.7
Y Coordinate: 1472807.39
X Coordinate: 1542051.35

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | subangular to rounded; 40% fine to coarse sand; subangular to rounded; no odor. Note: gravel is granite and metamorphic. | | | New connection @ 0930. |
| | | | | | Sandy lean CLAY with Gravel (CL); strong brown (7.5YR 4/6); moist; soft; high plasticity; 60% clay nodules; 20% coarse sand; subangular to rounded; | CL | | |
| 305 | | | | | 20% gravel to 0.5in; subangular to subrounded; no odor. Note: sand and gravel are predominantly pumice. | | | |
| | | | | | Well graded GRAVEL with Sand (GW); yellowish brown (10YR 5/4); moist; 75% gravel to 2in; subangular to subrounded; 25% fine to coarse sand; subangular to rounded; slight sweet odor. Note: gravel is granite and metamorphic. | | | |
| 310 | | | | | Same as above (305 ft); dry; 60% gravel to 1in; 40% fine to coarse sand; slight sweet odor. | GW | | |
| 315 | | | | | Same as above (305 ft); dry; 70% gravel to 1.5in; angular to subrounded; 30% fine to coarse sand; no odor. | | Bentonite Seal | New 20' connection @ 0945. |
| 320 | | | | | Poorly graded GRAVEL with Sand (GP); yellowish brown (10YR 5/4); dry; 80% gravel to 0.25in; subangular to rounded; 20% fine to coarse sand; subangular to rounded; no odor. Note: gravel is granite and metamorphic. | GP | | |
| 325 | | | | | Well graded SAND with Gravel (SW); yellowish brown (10YR 5/4); moist; 80% fine to coarse sand; subangular to rounded; 20% gravel to 0.75in; subangular to subrounded; slight sweet odor. Note: gravel is granite and metamorphic. | SW | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106121

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/19/2011
Date TD Reached: 5/22/2011
Date Completed: 5/25/2011

Ground Elevation AMSL (ft): 5343.7
Y Coordinate: 1472807.39
X Coordinate: 1542051.35

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | | | | |
| 335 | | | | | Well graded SAND with Gravel (SW); yellowish brown (10YR 5/4); dry; 70% fine to coarse sand; subangular to rounded; 30% gravel to 0.5in; subangular to rounded; no odor. Note: gravel is granite and metamorphic. | SW | Bentonite Seal | |
| 340 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; 100% fine to medium sand; trace coarse sand; subangular to rounded; slight sweet odor. | SP | Top of Filter Pack | New connection @ 1015. |
| 345 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; 100% fine to coarse sand; subangular to rounded; slight sweet odor.<br>Same as above (340 ft). | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 350 | | SB0197 | 0.1 | | Poorly graded SAND with Gravel (SP); yellowish brown (10YR 5/4); moist; 75% very fine to fine sand; subrounded to rounded; 20% gravel to 1.5in; subangular to rounded; 5% clay; stiff; low plasticity; no odor. Note: gravel is granite and metamorphic. | SP | Bottom of Screen | Blow counts (348.5-350'): 5/5/10.<br>New connection @ 1050. |
| 355 | | | | | Well graded GRAVEL with Sand (GW); pale brown (10YR 6/3); dry; 50% gravel to 1in; angular to subrounded; 50% fine to coarse sand; subangular to rounded; slight sweet odor. Note: gravel is granite and metamorphic.<br>Well graded GRAVEL with Sand (GW); dark yellowish brown (10YR 4/4); moist; 75% gravel to 1in; angular to subrounded; 25% fine to coarse sand; | GW | Bentonite Seal | New 20' connection @ 1110. Driller added water to cyclone for dust suppression. |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106121

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/19/2011
Date TD Reached: 5/22/2011
Date Completed: 5/25/2011

Ground Elevation AMSL (ft): 5343.7
Y Coordinate: 1472807.39
X Coordinate: 1542051.35

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | subangular to rounded; slight sweet odor. Note: gravel is granite and metamorphic. | | | |
| | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; 80% fine sand; 20% medium to coarse sand; subrounded to rounded; slight sweet odor. | SP | | |
| 365 | | | | | Well graded GRAVEL (GW); various colors; dry; 90% gravel to 0.75in; angular to subrounded; 10% fine to coarse sand; subangular to rounded; slight sweet odor. Note: gravel is granite and metamorphic. | | | Driller stopped adding water to cyclone. |
| 370 | | | | | Well graded GRAVEL with Sand (GW); dark yellowish brown (10YR 4/4); moist; 50% gravel to 1.5in; angular to subrounded; 50% fine to coarse sand; subangular to rounded; slight sweet odor. Note: gravel is granite and metamorphic. | GW | | |
| 375 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); wet; 100% fine sand; subrounded to rounded; slight sweet odor. | SP | Bentonite Seal | New connection @ 1130. Driller added water to cyclone for dust suppression. |
| 380 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); wet; 100% fine to coarse sand; subangular to rounded; slight sweet odor. | | | |
| 385 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); wet; 70% fine to coarse sand; subangular to rounded; 30% gravel to 0.5in; angular to rounded; slight sweet odor. Note: gravel is granite and metamorphic. | SW | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106121

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/19/2011
Date TD Reached: 5/22/2011
Date Completed: 5/25/2011

Ground Elevation AMSL (ft): 5343.7
Y Coordinate: 1472807.39
X Coordinate: 1542051.35

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); wet; 100% fine sand; trace medium to coarse sand; subrounded to rounded; slight sweet odor. | | | |
| 395 | | | | | Same as above (390 ft). | SP | | |
| 400 | | SB0198 | 0.1 | | Poorly graded SAND (SP); brown (10YR 5/3); moist; 80% fine to medium sand; 20% coarse sand; subrounded to rounded; trace clay; slight sweet odor. Poorly graded SAND (SP); brown (10YR 4/3); moist; 100% fine sand; subrounded to rounded; trace clay; slight sweet odor. | | | Blow counts (398.5-400'): 10/15/20. New connection @ 1210. Resumed drilling @ 1300. Driller added water to cyclone for dust suppression. |
| 405 | | | | | | | Bentonite Seal | |
| 410 | | | | | Poorly graded SAND with Silt (SP-SM); brown (10YR 4/3); wet; 90% fine sand; subrounded to rounded; 10% silt and clay; slight sweet odor. | SP-SM | | |
| 415 | | | | | Silty SAND (SM); dark yellowish brown (10YR 4/4); saturated; 70% very fine sand; subrounded to rounded; 30% silt; no odor. | SM | | |
| 420 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; 100% very fine to fine sand; subrounded to rounded; no odor. | SP | | New connection @ 1330. Driller stopped adding water to cyclone. |

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# Borehole ID: KAFB-106121

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/19/2011
Date TD Reached: 5/22/2011
Date Completed: 5/25/2011

Ground Elevation AMSL (ft): 5343.7
Y Coordinate: 1472807.39
X Coordinate: 1542051.35

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; 75% fine sand; 25% medium sand; subrounded to rounded; no odor. | SP | Bentonite Seal | |
| 425 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; 100% fine to coarse sand; subangular to rounded; no odor. | | Top of Filter Pack | |
| 430 | | | | | Same as above (425 ft); dark yellowish brown (10YR 4/6); wet; trace gravel to 0.125in; slight sweet odor. | SW | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Driller added water to cyclone for dust suppression. |
| 435 | | | | | Same as above (425 ft); dark yellowish brown (10YR 3/4); slight sweet odor. | | | New connection @ 1400. |
| 440 | | | | | | | Bottom of Screen | |
| 445 | | | | | Silty SAND (SM); dark brown (10YR 3/3); saturated; 80% fine to medium sand; subrounded to rounded; 20% silt; slight sweet odor. | SM | | Driller added water to cyclone for dust suppression. |
| | | | | | Poorly graded SAND with Gravel (SP); pale brown (10YR 6/3); dry; 65% fine sand; subrounded to rounded; 35% gravel to 2in; subangular to rounded; no odor. Note: gravel is granite and metamorphic. | SP | Bottom of Filter Pack | |
| 450 | | SB0199 | 2.7 | | Lean CLAY (CL); brown (10YR 5/3); | CL | Native Backfill | Blow counts (448.5-450'): 30/15/8. |

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# Borehole ID: KAFB-106121

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/19/2011
Date TD Reached: 5/22/2011
Date Completed: 5/25/2011

Ground Elevation AMSL (ft): 5343.7
Y Coordinate: 1472807.39
X Coordinate: 1542051.35

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | moist; stiff; low to medium pasticity; 100% clay; no odor. | | | Total depth = 450 ft. Reached @ 1445 on 5/22/11. |
| | | | | | | | | Water added during drilling (gallons) = 0 |
| 455 | | | | | | | | |
| | | | | | | | | Water added after drilling (gallons) = 0 |
| 460 | | | | | | | | Water added during construction (gallons) = Not recorded. |
| 465 | | | | | | | | |
| 470 | | | | | | | | |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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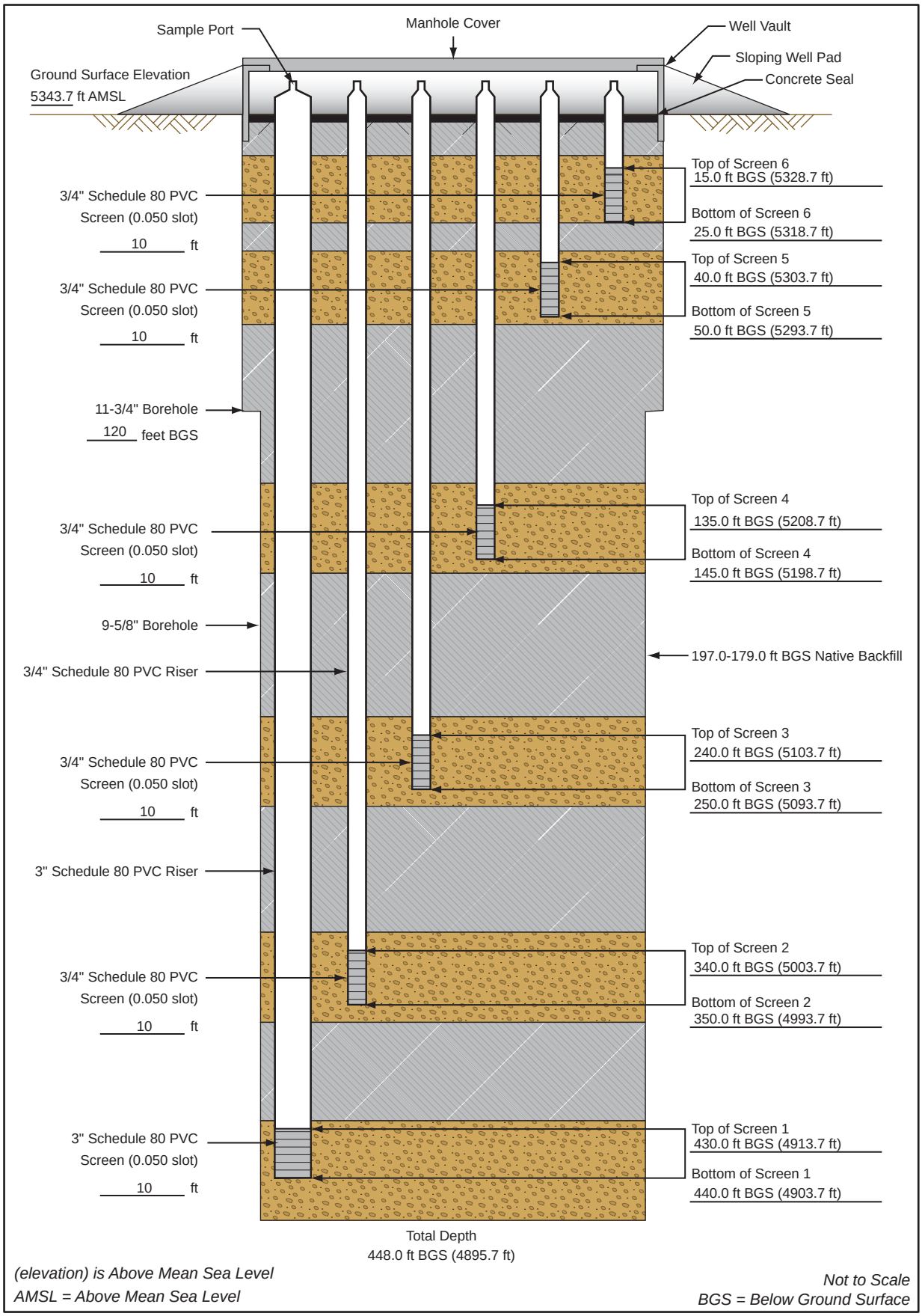
# Nested Soil Vapor Well Completion Diagram for KAFB-106121

Installation Start Date/Time: 5/23/2011 @ 08:15
Installation End Date/Time: 5/25/2011 @ 11:00



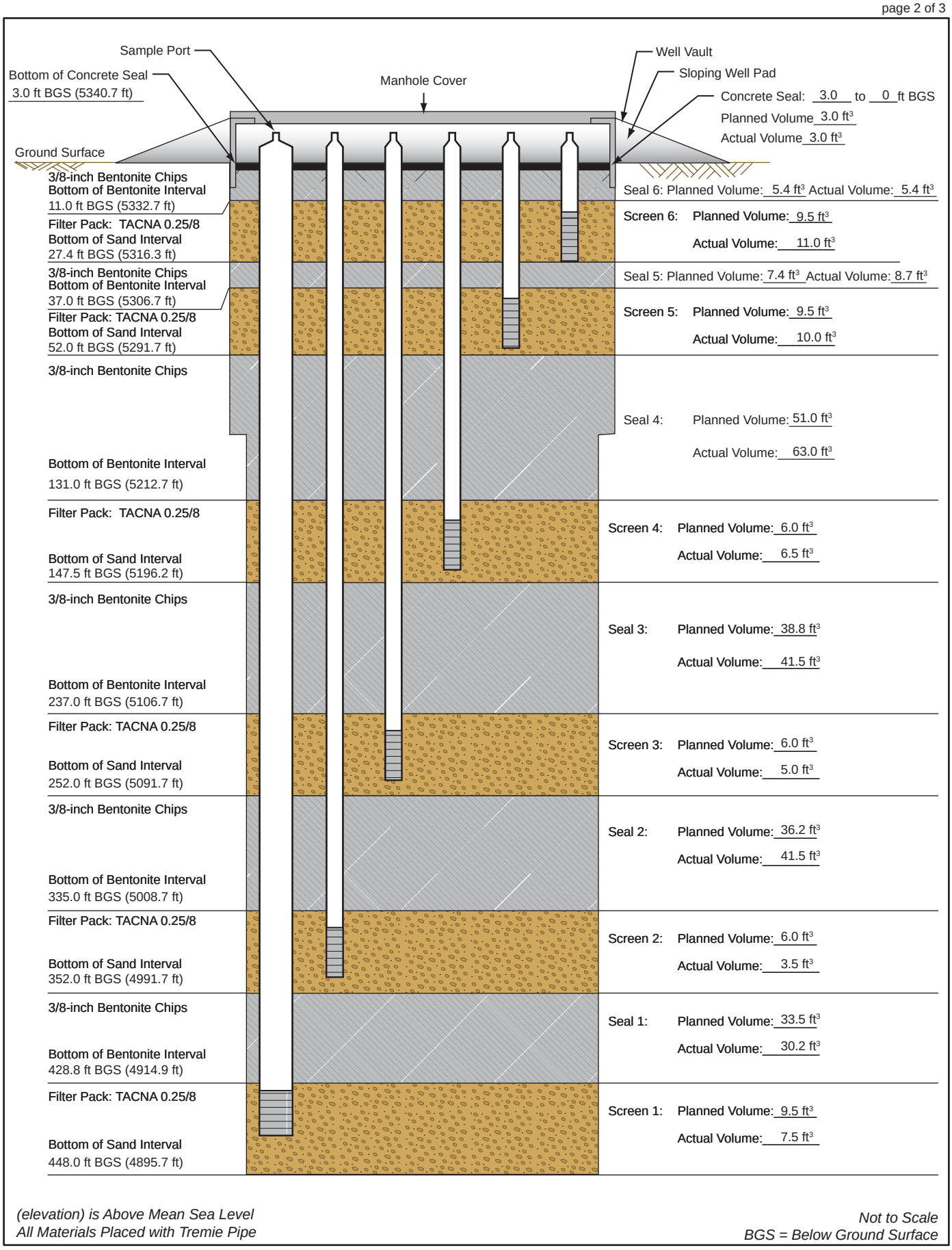



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106121






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

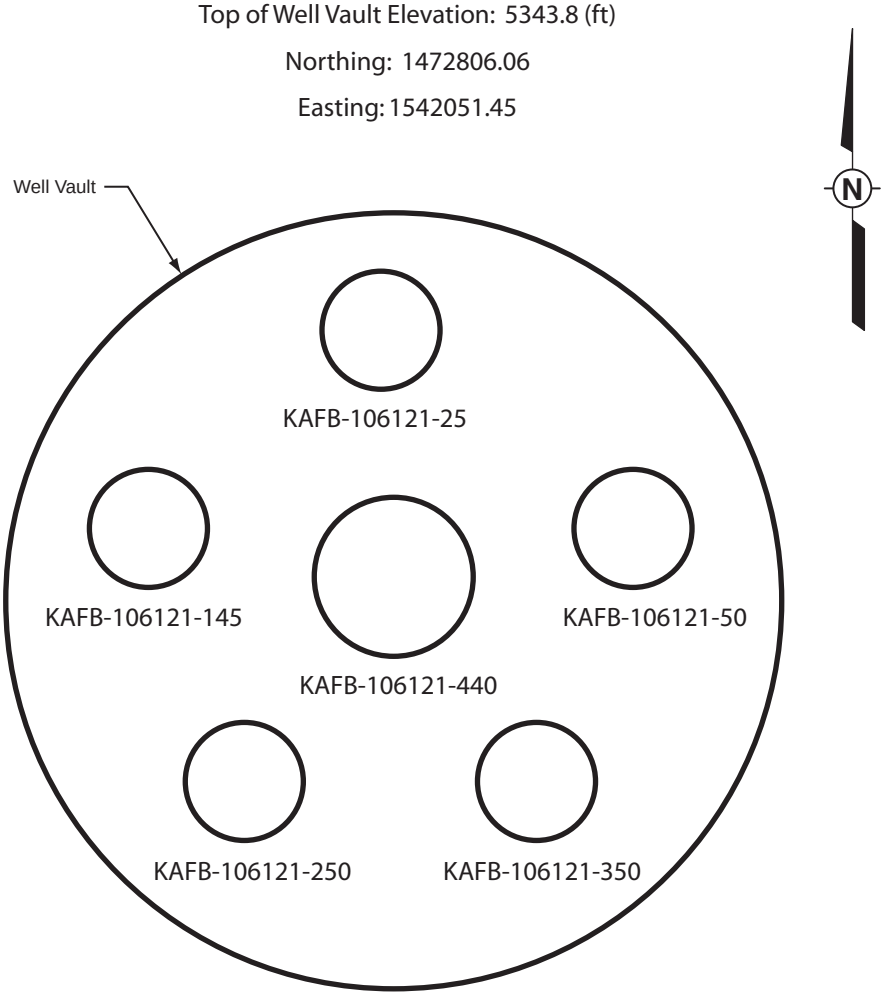
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106121



Top of Well Vault Elevation: 5343.8 (ft)

Northing: 1472806.06

Easting: 1542051.45




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106121-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1472805.85 | 1542051.53 | 5343.5 |
| KAFB-106121-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1472805.67 | 1542051.78 | 5343.5 |
| KAFB-106121-145 | 3/4 | 145.0 | 135.0 - 145.0 | 1472805.62 | 1542051.25 | 5343.5 |
| KAFB-106121-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1472805.36 | 1542051.37 | 5343.5 |
| KAFB-106121-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1472805.38 | 1542051.75 | 5343.5 |
| KAFB-106121-440 | 3 | 440.0 | 430.0 - 440.0 | 1472805.67 | 1542051.48 | 5343.5 |

# Borehole ID: KAFB-106122

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/14/2011
Date TD Reached: 6/16/2011
Date Completed: 6/18/2011

Ground Elevation AMSL (ft): 5343.9
Y Coordinate: 1472868.57
X Coordinate: 1542096.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Sandy SILT (ML); brown (7.5YR 5/3); dry; soft; nonplastic; 60% silt; 40% fine to coarse sand; angular; no odor. | | Concrete Seal | Hand augured. |
| 5 | | | | | SILT with Sand (ML); light brown (7.5YR 6/4); dry; soft; nonplastic; 80% silt; 20% sand; subrounded; trace gravel; no odor. Note: caliche coating on gravel. | | Bentonite Seal | Began drilling @ 1336 on 6/14/11. |
| | | SB0200 | 0.0 | | | | | Blow counts (7-8.5'): 19/23. |
| 10 | | | | | SILT (ML); brown (7.5YR 4/4); damp; soft; nonplastic; 95% silt; 5% fine gravel; subrounded; trace caliche nodules; no odor. | ML | Top of Filter Pack | |
| 15 | | | | | Same as above (10 ft); low plasticity; 100% silt; trace fine gravel; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1411. New 10' connection @ 1439. Resumed drilling @ 1439. |
| | | SB0201 | 0.0 | | | | | Blow counts (17-18.5'): 30/35. |
| 20 | | | | | Silty SAND (SM); yellowish brown (10YR 5/4); dry; dense; 60% fine to coarse sand; subrounded; 5% fine gravel; subrounded; 35% silt; nonplastic; no odor. Note: granitic sand. | SM | | |
| 25 | | | | | SILT (ML); brown (7.5YR 4/4); damp; stiff; non to low plasticity; 100% silt; trace elastic silt nodules; no odor. | ML | Bottom of Screen | Kelly down @ 1448. New 10' connection @ 1510. Resumed drilling @ 1510. |
| | | SB0202 SB0203 | 0.0 | | | | Bentonite Seal | Blow counts (27-28.5'): 35/40. |
| 30 | | | | | | | | |

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# Borehole ID: KAFB-106122

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/14/2011
Date TD Reached: 6/16/2011
Date Completed: 6/18/2011

Ground Elevation AMSL (ft): 5343.9
Y Coordinate: 1472868.57
X Coordinate: 1542096.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); brown (7.5YR 4/4); damp; stiff; low to medium plasticity; 100% silt; no odor. | | | |
| 35 | | | | | SILT (ML); brown (7.5YR 5/3); dry; stiff; nonplastic; 100% silt; trace fine sand; angular; no odor. | | Bentonite Seal | Kelly down @ 1518. New 10' connection @ 1542. Resumed drilling @ 1542. |
| | | SB0204 | 0.0 | | | | Top of Filter Pack | Blow counts (37-38.5'): 55/65. |
| 40 | | | | | Same as above (34 ft). | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 45 | | | | | Same as above (34 ft); strong brown (7.5YR 5/6); 95% silt; 5% fine gravel; subrounded. | ML | | Kelly down @ 1548. New 10' connection @ 1622. Resumed drilling @ 1622. |
| | | SB0205 | 0.0 | | | | | Blow counts (47-48.5'): 30/40. |
| 50 | | SB0205 | | | Same as above (34 ft); no odor. | | Bottom of Screen | Blow counts (48.5-50'): 50/4. |
| 55 | | | | | Same as above (34 ft); trace fine to coarse sand; no odor. | | Bentonite Seal | Kelly down @ 1628. New 20' connection @ 1640. Resumed drilling @ 1640. |
| 60 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 9/27/11 11:54 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106122

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/14/2011
Date TD Reached: 6/16/2011
Date Completed: 6/18/2011

Ground Elevation AMSL (ft): 5343.9
Y Coordinate: 1472868.57
X Coordinate: 1542096.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Poorly graded GRAVEL with Sand (GP); yellowish brown (10YR 5/4); dry; dense; 80% fine gravel; angular; 20% fine to coarse sand; angular; no odor. Note: gravel is composed of granite. | GP | | |
| 65 | | | | | Silty SAND (SM); yellowish brown (10YR 5/4); dry; dense; 55% fine to coarse sand; angular; 10% fine gravel to 1cm; angular; 35% silt; no odor. | SM | | |
| 70 | | | | | SILT with Gravel (ML); strong brown (7.5YR 5/6); dry; stiff; nonplastic; 80% silt; 20% fine gravel; subangular to subrounded; no odor. | | | |
| 75 | | | | | SILT (ML); brown (7.5YR 5/4); damp; stiff; nonplastic; 100% silt; no odor. | | Bentonite Seal | Kelly down @ 1649. New 20' connection @ 1659. Resumed drilling @ 1659. |
| 80 | | | | | Same as above (75 ft); light brown (7.5YR 6/4). | ML | | |
| 85 | | | | | Same as above (75 ft). | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106122

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/14/2011
Date TD Reached: 6/16/2011
Date Completed: 6/18/2011

Ground Elevation AMSL (ft): 5343.9
Y Coordinate: 1472868.57
X Coordinate: 1542096.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); light brown (7.5YR 6/4); dry; stiff; nonplastic; 100% silt; no odor. | ML | | |
| 95 | | | | | Same as above (90 ft); brown (7.5YR 5/4); soft. | | | Kelly down @ 1710. End of 6/14/11. New 20' connection @ 0912 on 6/15/11. Resumed drilling @ 0912. Blow counts (97-98.5'): 40/50. |
| | | SB0206 | 0.0 | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 95% fine to coarse sand; subrounded to rounded; 5% fine gravel; rounded; abundant tuff; no odor. | SW | | |
| 100 | | | | | Same as above (97 ft). | | | |
| 105 | | | | | Same as above (97 ft). | | Bentonite Seal | |
| 110 | | | | | SILT (ML); light brown (7.5YR 6/4); damp; stiff; nonplastic; 90% silt; 10% fine gravel to 2cm; subangular; no odor. | ML | | |
| | | | | | Same as above (107 ft). | | | |
| 115 | | | | | Same as above (107 ft); strong brown (7.5YR 5/6); 100% silt; trace gravel. | | | Kelly down @ 0918. New 5' connection @ 0929. Resumed drilling @ 0929. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106122

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/14/2011
Date TD Reached: 6/16/2011
Date Completed: 6/18/2011

Ground Elevation AMSL (ft): 5343.9
Y Coordinate: 1472868.57
X Coordinate: 1542096.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT (ML); brown (7.5YR 5/4); damp; stiff; non to low plasticity; 100% silt; no odor. | | | Kelly down @ 0932. Total depth with 11-3/4" casing. Resumed drilling with 9-5/8" casing @ 1134. |
| 125 | | | | | Same as above (120 ft). | ML | | |
| 130 | | | | | | | Bentonite Seal | |
| | | | | | Lean CLAY (CL); brown (7.5YR 4/4); damp; stiff; medium to high plasticity; 100% clay; no odor. | CL | | |
| 135 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 95% fine sand; rounded; 5% medium to coarse sand; rounded; no odor. Note: volcanic tuff present. | SP | Top of Filter Pack | Kelly down @ 1143. New 10' connection @ 1155. Resumed drilling @ 1155. |
| 140 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); dry; dense; 85% fine to coarse sand; subrounded; 15% fine gravel to 1cm; rounded; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 145 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 95% fine to coarse sand; 5% fine gravel to 3.5cm; rounded; no odor. | SW | | Kelly down @ 1305. New 10' connection @ 1338. Resumed drilling @ 1338. Blow counts (147-148.5'): 35/40. Blow counts (148.5-150'): |
| | | SB0207 | 0.0 | | | | | |
| | | SB0207-MS | | | | | | |
| 150 | | SB0207-MSD | 0.0 | | | | | |

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# Borehole ID: KAFB-106122

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/14/2011
Date TD Reached: 6/16/2011
Date Completed: 6/18/2011

Ground Elevation AMSL (ft): 5343.9
Y Coordinate: 1472868.57
X Coordinate: 1542096.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | SILT (ML); brown (7.5YR 5/4); damp; stiff; nonplastic; 100% silt; no odor. | ML | Bottom of Screen | 60/75. |
| 155 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 95% fine to coarse sand; rounded; 5% fine gravel to 1.5cm; rounded; no odor. | SW | | Kelly down @ 1342. New 20' connection @ 1357. Resumed drilling @ 1357. |
| 160 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 85% fine gravel; subrounded to rounded; 15% fine to coarse sand; no odor. Note: gravel is composed of basalt. | GP | | |
| 165 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 95% fine to coarse sand; subrounded; 5% fine gravel to 1cm; rounded; no odor. | SW | Bentonite Seal | |
| 170 | | | | | Same as above (165 ft); light yellowish brown (10YR 6/4); 100% fine to coarse sand; rounded; no odor. Note: sand is composed of volcanic tuff. | | | |
| 175 | | | | | Same as above (165 ft); trace gravel. | | | Kelly down @ 1405. New 20' connection @ 1414. Resumed drilling @ 1414. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106122

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/14/2011
Date TD Reached: 6/16/2011
Date Completed: 6/18/2011

Ground Elevation AMSL (ft): 5343.9
Y Coordinate: 1472868.57
X Coordinate: 1542096.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND (SW); light yellowish brown (10YR 6/4); dry; dense; 90% fine to coarse sand; rounded; 10% fine gravel; rounded; no odor. Note: sand is composed of volcanic tuff. | SW | | |
| 185 | | | | | Poorly graded GRAVEL (GP); dry; dense; 90% fine gravel to 2cm; rounded; 10% fine to coarse sand; rounded; no odor. Note: gravel is composed of basalt. | GP | | |
| 190 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); dry; dense; 80% fine to coarse sand; subrounded; 20% fine gravel; subrounded; no odor. | | | |
| 195 | | | | | Well graded SAND (SW); light yellowish brown (10YR 6/4); dry; dense; 100% fine to coarse sand; subrounded to rounded; trace gravel; no odor. Note: sand is composed of volcanic tuff. | | Bentonite Seal | Kelly down @ 1418. New 20' connection @ 1449. Resumed drilling @ 1449. Blow counts (197-198.5'): 30/45. |
| | | SB0208 | 0.0 | | | | | |
| 200 | | | | | Same as above (195 ft). | SW | | |
| 205 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); damp; dense; 85% fine to coarse sand; rounded; 15% fine gravel to 3cm; rounded; no odor. | | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106122

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/14/2011
Date TD Reached: 6/16/2011
Date Completed: 6/18/2011

Ground Elevation AMSL (ft): 5343.9
Y Coordinate: 1472868.57
X Coordinate: 1542096.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 5/3); dry; dense; 85% fine gravel to 2.5cm; subrounded; 15% coarse sand; no odor. Note: gravel is composed of basalt. | | | |
| 215 | | | | | Same as above (210 ft). | GP | | Kelly down @ 1513. New 20' connection @ 1520. Resumed drilling @ 1520. |
| 220 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); dry; dense; 85% fine to coarse sand; rounded; 15% fine gravel; rounded; no odor. | | Bentonite Seal | |
| 225 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; rounded; no odor. | | | |
| 230 | | | | | Same as above (225 ft). | SW | | |
| 235 | | | | | Same as above (225 ft); 95% sand; 5% gravel. | | Top of Filter Pack | Kelly down @ 1528. New 10' connection @ 1534. Resumed drilling @ 1534. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106122

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/14/2011
Date TD Reached: 6/16/2011
Date Completed: 6/18/2011

Ground Elevation AMSL (ft): 5343.9
Y Coordinate: 1472868.57
X Coordinate: 1542096.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); dry; dense; 75% fine to coarse sand; rounded; 25% fine gravel to 2cm; rounded; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 245 | | | | | Same as above (240 ft); gravel to 3.5cm. | SW | | Kelly down @ 1543. New 10' connection @ 1604. Resumed drilling @ 1604. Blow counts (247-248.5'): 25/40. |
| | | SB0209 | 0.0 | | | | | |
| 250 | | | | | SILT (ML); light olive brown (2.5Y 5/3); damp; stiff; low to medium plasticity; 100% silt; no odor. | | Bottom of Screen | |
| 255 | | | | | Same as above (250 ft). | ML | | Kelly down @ 1611. New 20' connection @ 1622. Resumed drilling @ 1623. |
| 260 | | | | | Well graded SAND with Silt (SW-SM); brown (10YR 5/3); damp; dense; 90% fine to coarse sand; rounded; 10% silt; no odor. | SW-SM | Bentonite Seal | |
| 265 | | | | | Well graded SAND (SW); brown (10YR 5/3); damp; dense; 100% fine to coarse sand; rounded; no odor. | SW | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106122

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/14/2011
Date TD Reached: 6/16/2011
Date Completed: 6/18/2011

Ground Elevation AMSL (ft): 5343.9
Y Coordinate: 1472868.57
X Coordinate: 1542096.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Lean CLAY (CL); olive (5Y 5/3); damp; stiff; medium to high plasticity; 90% clay; 10% fine sand; no odor. | CL | | |
| 275 | | | | | Well graded SAND (SW); brown (10YR 5/3); damp; dense; 100% fine to coarse sand; rounded; trace gravel; no odor. | SW | | Kelly down @ 1633. New 20' connection @ 1641. Resumed drilling @ 1641. |
| 280 | | | | | Same as above (275 ft). | | | |
| 285 | | | | | SILT (ML); light olive brown (2.5Y 5/3); damp; stiff; low to medium plasticity; 100% silt; no odor. | ML | Bentonite Seal | |
| 290 | | | | | Well graded SAND (SW); brown (10YR 5/3); damp; dense; 100% fine to coarse sand; rounded; no odor. | SW | | |
| 295 | | | | | Same as above (290 ft); trace fine gravel. | | | Kelly down @ 1649. End of 6/15/11. New 20' connection @ 0834 on 6/16/11. Resumed drilling @ 0834. Blow counts (297-298.5'): 30/45. |
| | X | SB0210 | 0.0 | | | | | |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 9/27/11 11:55 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106122

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/14/2011
Date TD Reached: 6/16/2011
Date Completed: 6/18/2011

Ground Elevation AMSL (ft): 5343.9
Y Coordinate: 1472868.57
X Coordinate: 1542096.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 5/3); damp; dense; 55% fine gravel to 4cm; rounded; 45% fine to coarse sand; rounded; no odor. Note: gravel is composed of basalt. | GP | | |
| 305 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); damp; dense; 70% fine to coarse sand; rounded; 25% fine gravel to 3cm; rounded; 5% silt and clay; no odor. | | | |
| 310 | | | | | Same as above (305 ft); clay nodules. | | | |
| 315 | | | | | Same as above (305 ft); no clay. | SW | Bentonite Seal | Kelly down @ 0842. New 20' connection @ 0850. Resumed drilling @ 0850. |
| 320 | | | | | Same as above (305 ft); 85% fine to coarse sand; 15% gravel; no odor. | | | |
| 325 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; dense; 100% fine to medium sand; subrounded; trace coarse sand; no odor. | SP | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 9/27/11 11:55 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106122

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/14/2011
Date TD Reached: 6/16/2011
Date Completed: 6/18/2011

Ground Elevation AMSL (ft): 5343.9
Y Coordinate: 1472868.57
X Coordinate: 1542096.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); damp; dense; 55% fine to coarse sand; subrounded; 45% fine gravel; rounded; no odor. | SW | Bentonite Seal | |
| 335 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); damp; dense; 65% fine gravel; rounded; 30% fine to coarse sand; 5% silt and clay; no odor. Note: gravel is composed of basalt. | GP | Top of Filter Pack | Kelly down @ 0857. New 10' connection @ 0905. Resumed drilling @ 0905. |
| 340 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 345 | | | | | Same as above (340 ft); subangular sand. | SW | | Kelly down @ 0911. New 10' connection @ 0943. Resumed drilling @ 0943. Blow counts (347-348.5'): 20/25. |
| | | SB0211 | 0.0 | | | | | |
| 350 | | | | | Same as above (340 ft); trace gravel. | SW | Bottom of Screen | |
| 355 | | | | | Poorly graded GRAVEL (GP); brown (10YR 5/3); dry; dense; 90% fine gravel; subrounded; 10% fine to coarse sand; rounded; no odor. Note: gravel is composed of basalt. | GP | Bentonite Seal | Kelly down @ 0948. New 20' connection @ 1001. Resumed drilling @ 1001. |
| 360 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 9/27/11 11:55 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106122

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/14/2011
Date TD Reached: 6/16/2011
Date Completed: 6/18/2011

Ground Elevation AMSL (ft): 5343.9
Y Coordinate: 1472868.57
X Coordinate: 1542096.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | | | | |
| 365 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 5/3); damp; dense; 55% fine gravel; rounded; 45% fine to coarse sand; no odor. | GP | | |
| 370 | | | | | Poorly graded SAND with Gravel (SP); brown (10YR 5/3); damp; dense; 75% fine sand; rounded; 25% fine gravel; subrounded to rounded; no odor. | SP | | |
| 375 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 5/3); damp; dense; 55% fine gravel; rounded; 45% fine to coarse sand; no odor. | GP | | |
| 380 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 100% fine to coarse sand; subrounded; no odor. | SW | Bentonite Seal | Kelly down @ 1008. New 20' connection @ 1018. Resumed drilling @ 1018. |
| 385 | | | | | Poorly graded SAND with Gravel (SP); brown (10YR 5/3); damp; dense; 75% fine sand; rounded; 25% fine gravel; subrounded to rounded; no odor. | SP | | |
| 390 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subangular; 5% fine gravel to 1cm; subangular. | SW | | |

# Borehole ID: KAFB-106122

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/14/2011
Date TD Reached: 6/16/2011
Date Completed: 6/18/2011

Ground Elevation AMSL (ft): 5343.9
Y Coordinate: 1472868.57
X Coordinate: 1542096.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 80% fine to coarse sand; subangular; 20% fine gravel to 1cm; rounded; no odor. | SW | | |
| | | | | | SILT (ML); brown (7.5YR 5/4); damp; stiff; nonplastic; 100% silt; no odor. | | | |
| 395 | | | | | Same as above (392 ft). | ML | | Kelly down @ 1029. New 20' connection @ 1422. Resumed drilling @ 1423. |
| | | SB0212 | 0.0 | | | | | Blow counts (397-398.5'): 25/40. |
| 400 | | SB1744 | 0.0 | | | | | Blow counts (398.5-400'): 25/50. |
| | | SB1744 | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subrounded to rounded; no odor. | SW | | Blow counts (400-401.5'): 30/50. |
| 405 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; rounded; no odor. | | Bentonite Seal | |
| 410 | | | | | Same as above (405 ft). | SP | | |
| 415 | | | | | Same as above (405 ft); trace coarse sand. | | | Kelly down @ 1436. New 10' connection @ 1442. Resumed drilling @ 1442. |
| 420 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 9/27/11 11:55 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106122

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/14/2011
Date TD Reached: 6/16/2011
Date Completed: 6/18/2011

Ground Elevation AMSL (ft): 5343.9
Y Coordinate: 1472868.57
X Coordinate: 1542096.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | SW | | |
| 425 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 100% fine to medium sand; subangular to subrounded; trace coarse sand; no odor. | | Bentonite Seal | Kelly down @ 1448. New 10' connection @ 1455. Resumed drilling @ 1455. |
| 430 | | | | | Same as above (425 ft). | | Top of Filter Pack | |
| 435 | | | | | Same as above (425 ft); 100% very fine to fine sand; no odor. | SP | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1507. New connection @ 1517. Resumed drilling @ 1517. |
| 440 | | | | | Same as above (425 ft); 95% fine to medium sand; 5% coarse sand. | | | |
| 445 | | | | | Same as above (425 ft). | | Bottom of Screen | |
| | | SB0213 | 0.0 | | SILT with Gravel (ML); light brownish gray (2.5Y 6/2); damp; stiff; nonplastic; 80% silt; 20% fine gravel to 3cm; rounded; no odor. | ML | | Blow counts (447-448.5'): 20/25. Total depth = 448 ft. Reached @ 1528 on |
| 450 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 9/27/11 11:55 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106122

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/14/2011
Date TD Reached: 6/16/2011
Date Completed: 6/18/2011

Ground Elevation AMSL (ft): 5343.9
Y Coordinate: 1472868.57
X Coordinate: 1542096.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: Not Recorded
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock

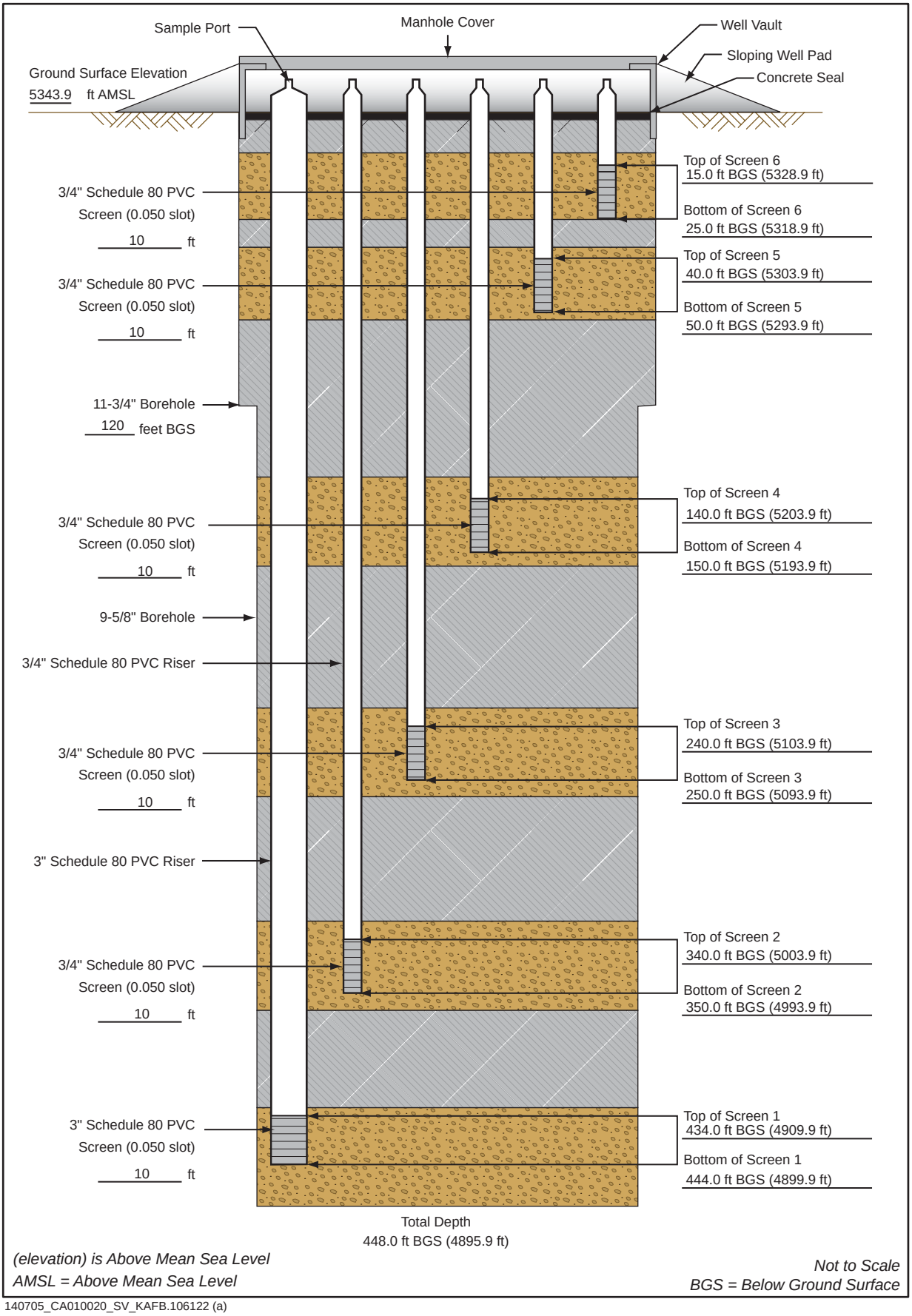


| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | 6/16/11. |
| | | | | | | | | Water added during drilling (gallons) = 0 |
| 455 | | | | | | | | Water added after drilling (gallons) = 0 |
| 460 | | | | | | | | Water added during construction (gallons) = Not recorded. |
| 465 | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 470 | | | | | | | | |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

# Nested Soil Vapor Well Completion Diagram for KAFB-106122

Installation Start Date/Time: 6/17/2011 @ 07:30
Installation End Date/Time: 6/18/2011 @ 16:30



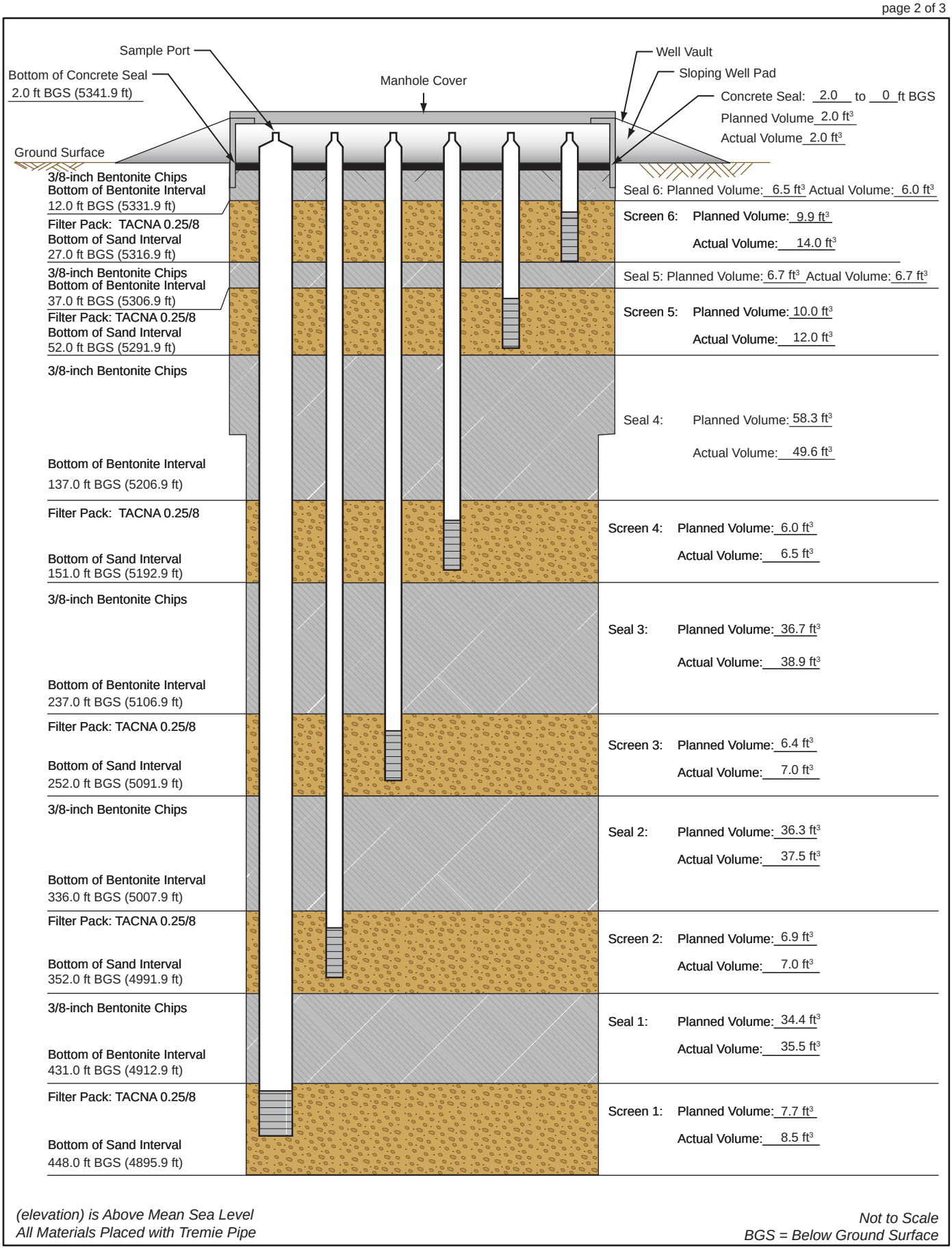



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106122






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

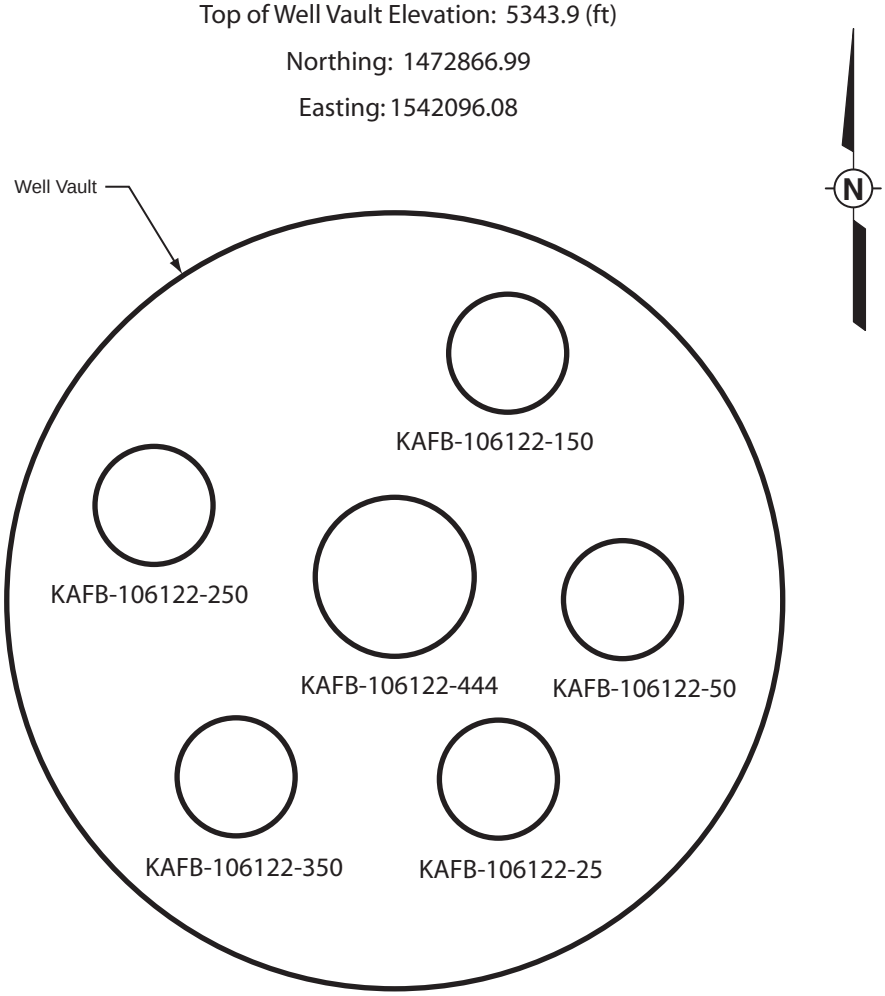
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106122



Top of Well Vault Elevation: 5343.9 (ft)

Northing: 1472866.99

Easting: 1542096.08




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| AFB-106122-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1472866.33 | 1542096.33 | 5343.6 |
| KAFB-106122-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1472866.63 | 1542096.27 | 5343.5 |
| KAFB-106122-150 | 3/4 | 150.0 | 140.0 - 150.0 | 1472866.69 | 1542095.99 | 5343.5 |
| KAFB-106122-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1472866.40 | 1542095.88 | 5343.6 |
| KAFB-106122-350 | 3/4 | 340.0 | 340.0 - 350.0 | 1472866.19 | 1542096.10 | 5343.6 |
| KAFB-106122-444 | 3 | 444.0 | 434.0 - 444.0 | 1472866.53 | 1542096.09 | 5343.6 |

# Borehole ID: KAFB-106123

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/31/2011
Date TD Reached: 6/2/2011
Date Completed: 6/4/2011

Ground Elevation AMSL (ft): 5344.0
Y Coordinate:
X Coordinate:

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Sandy SILT (ML); light brown (7.5YR 6/4); dry; soft; nonplastic; 70% silt; 30% fine to coarse sand; angular to subangular; trace gravel to 1cm; no odor. | | Concrete Seal | Hand augered. |
| 5 | | | | | Gravelly SILT (ML); light brown (7.5YR 6/4); dry; soft; nonplastic; 70% silt; 30% fine gravel to 1cm; rounded; no odor. Note: caliche coating on gravel. | | Bentonite Seal | Began drilling @ 0900 on 5/31/11. |
| | | SB0214 | 0.0 | | | | | Blow counts (8-9.5'): 40/25. Blow counts (9.5-11'): 37/30. Resumed drilling @ 0940. |
| 10 | | SB0215 | 0.0 | | SILT (ML); brown (7.5YR 5/4); damp; soft; non to low plasticity; 95% silt; 5% fine to coarse sand; no odor. Note: caliche coating on sand. | | Top of Filter Pack | |
| 15 | | | | | Same as above (10 ft); slight odor. | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 0952. New 10' connection @ 1018. Resumed drilling @ 1018. |
| | | SB0216 | 0.0 | | | | | Blow count (17-18.5'): 32/35. |
| 20 | | | | | Same as above (10 ft); nonplastic. | | | |
| 25 | | | | | Same as above (10 ft); non to low plasticity; 100% silt; trace fine to coarse sand; no odor. | | Bottom of Screen | Kelly down @ 1026. New 10' connection @ 1047. Resumed drilling @ 1048. |
| | | SB0217, SB0217-MS, SB0217-MSD | 0.0 | | | | Bentonite Seal | Blow counts (27-28.5'): 50/28. |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 7/15/11 10:23 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106123

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/31/2011
Date TD Reached: 6/2/2011
Date Completed: 6/4/2011

Ground Elevation AMSL (ft): 5344.0
Y Coordinate:
X Coordinate:

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); brown (7.5YR 5/4); damp; stiff; low plasticity; 100% silt; no odor. | | Bentonite Seal | |
| 35 | | | | | SILT (ML); light brown (7.5YR 6/4); dry; stiff; non to low plasticity; 95% silt; 5% fine to coarse sand; no odor. | | Top of Filter Pack | Kelly down @ 1100. New 10' connection @ 1127. Resumed drilling @ 1127. Blow counts (37-38.5'): 40/45. |
| | | SB0218 | 0.0 | | | | | |
| 40 | | | | | Same as above (35 ft). | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 45 | | | | | Same as above (35 ft); slightly indurated fragments. | ML | | Kelly down @ 1136. New 10' connection @ 1159. Resumed drilling @ 1243. Blow counts (47-48.5'): 35/40. |
| | | SB0219 | 0.0 | | | | | |
| 50 | | | | | Same as above (35 ft); trace gravel to 1cm. Note: caliche coating on gravel. | | Bottom of Screen | |
| 55 | | | | | Same as above (35 ft); brown (7.5YR 5/3). | | Bentonite Seal | Kelly down @ 1254. New 20' connection @ 1308. Resumed drilling @ 1308. |
| 60 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 7/15/11 10:23 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106123

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/31/2011
Date TD Reached: 6/2/2011
Date Completed: 6/4/2011

Ground Elevation AMSL (ft): 5344.0
Y Coordinate:
X Coordinate:

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); dry; stiff; nonplastic; 55% silt; 45% fine to coarse sand; angular; trace gravel; no odor. Note: sand is composed of granite. | | | |
| 65 | | | | | SILT (ML); strong brown (7.5YR 4/6); damp; stiff; low to medium plasticity; 100% silt; trace coarse sand; no odor. | | | |
| 70 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); damp; stiff; nonplastic; 60% silt; 40% fine to coarse sand; subangular; trace gravel to 1cm; subrounded; no odor. | | | |
| 75 | | | | | SILT (ML); strong brown (7.5YR 4/6); damp; stiff; non to low plasticity; 100% silt; no odor. | ML | Bentonite Seal | Kelly down @ 1322. New 20' connection @ 1332. Resumed drilling @ 1332. |
| 80 | | | | | Same as above (75 ft). | | | |
| 85 | | | | | SILT (ML); strong brown (7.5YR 4/6); dry; stiff; low to medium plasticity; 100% silt; trace fine to coarse sand; angular; no odor. | | | |
| 90 | | | | | | | | |

# Borehole ID: KAFB-106123

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/31/2011
Date TD Reached: 6/2/2011
Date Completed: 6/4/2011

Ground Elevation AMSL (ft): 5344.0
Y Coordinate:
X Coordinate:

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); brown (7.5YR 5/4); dry; stiff; non to low plasticity; 100% silt; no odor. | ML | | |
| 95 | | | | | Lean CLAY (CL); reddish brown (5YR 4/4); damp; very stiff; medium to high plasticity; 100% clay; no odor. | CL | | Kelly down @ 1350. New 20' connection @ 1420. Resumed drilling @ 1420. Blow counts (97-98.5'): 40/30. |
| | | SB0220 | 0.0 | | | | | |
| 100 | | | | | Same as above (95 ft); brown (7.5YR 5/3). | | | |
| 105 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% fine to coarse sand; rounded; abundant tuff grains; no odor. | SW | Bentonite Seal | |
| 110 | | | | | SILT with Sand (ML); brown (7.5YR 5/3); dry; firm; nonplastic; 75% silt; 25% fine to coarse sand; angular; trace tuff grains; no odor. Note: sand is composed of granite. | ML | | |
| 115 | | | | | SILT (ML); light brown (7.5YR 6/4); dry; stiff; nonplastic; 100% silt; trace gravel to 3cm; subrounded; no odor. | | | Kelly down @ 1430. New 5' connection @ 1444. Resumed drilling @ 1445. |
| 120 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 7/15/11 10:23 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106123

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/31/2011
Date TD Reached: 6/2/2011
Date Completed: 6/4/2011

Ground Elevation AMSL (ft): 5344.0
Y Coordinate:
X Coordinate:

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT (ML); light brown (7.5YR 6/4); dry; stiff; low plasticity; 100% silt; trace fine to coarse sand; angular; no odor. | | | Kelly down @ 1450. Total depth with 11-3/4" casing. Resumed drilling with 9-5/8" casing @ 1651. |
| 125 | | | | | Same as above (120 ft). | | | |
| 130 | | | | | SILT (ML); brown (7.5YR 5/4); damp; stiff; medium plasticity; 100% silt; no odor. | ML | Bentonite Seal | |
| 135 | | | | | SILT (ML); brown (7.5YR 5/4); damp; stiff; nonplastic; 100% silt; no odor. | | | Kelly down @ 1703. New 10' connection @ 1715. End of 5/31/11. Resumed drilling @ 0745 on 6/1/11. |
| 140 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; loose; 75% fine to coarse sand; subangular to subrounded; 25% fine gravel to 2cm; subrounded; no odor. | SW | Top of Filter Pack<br>Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 145 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; very dense; 95% fine to coarse sand; subrounded; 5% fine gravel to 1cm; rounded; some tuff grains; no odor. | | | Kelly down @ 0747. New 10' connection @ 0823. Resumed drilling @ 0823. Blow counts (147-148.5'): 35/40. |
| | | SB0221 | 0.0 | | | | | |
| 150 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 7/15/11 10:23 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106123

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/31/2011
Date TD Reached: 6/2/2011
Date Completed: 6/4/2011

Ground Elevation AMSL (ft): 5344.0
Y Coordinate:
X Coordinate:

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | SILT (ML); brown (7.5YR 5/3); damp; very stiff; low to medium plasticity; 100% silt; trace gravel; no odor. | ML | Bottom of Screen | |
| 155 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; rounded; no odor. | SW | | Kelly down @ 0830. New 20' connection @ 0838. Resumed drilling @ 0838. |
| 160 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); dry; loose; 75% fine to coarse sand; rounded; 25% fine gravel to 3cm; rounded; no odor. | | | |
| 165 | | | | | Same as above (160 ft); 85% fine to coarse sand; 15% fine gravel; rounded; abundant tuff; no odor. | | Bentonite Seal | |
| 170 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% fine to coarse sand; rounded; abundant tuff; no odor. | | | |
| 175 | | | | | Same as above (170 ft); 95% fine to coarse sand; rounded; 5% fine gravel; rounded; no odor. | | | Kelly down @ 0843. New 20' connection @ 0856. Resumed drilling @ 0856. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106123

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/31/2011
Date TD Reached: 6/2/2011
Date Completed: 6/4/2011

Ground Elevation AMSL (ft): 5344.0
Y Coordinate:
X Coordinate:

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% fine to coarse sand; rounded; abundant tuff; no odor. | | | |
| 185 | | | | | Same as above (180 ft); trace fine gravel to 1.5cm; rounded. | | | |
| 190 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 75% fine to coarse sand; rounded; 20% fine gravel to 2cm; subrounded to rounded; 5% clay nodules; no odor. | SW | | |
| 195 | | | | | Same as above (190 ft); 80% fine to coarse sand; rounded; 20% fine gravel; subangular to subrounded; no odor. | | Bentonite Seal | Kelly down @ 0901. New 20' connection @ 0942. Resumed drilling @ 0942. Blow counts (197-198.5'): 45/40. |
| | | SB0222 | 0.0 | | | | | |
| 200 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; rounded; trace gravel; no odor. | | | |
| 205 | | | | | Poorly graded SAND with Silt (SP-SM); brown (10YR 5/3); dry; dense; 90% fine to medium sand; rounded; 10% silt; no odor. | SP-SM | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106123

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/31/2011
Date TD Reached: 6/2/2011
Date Completed: 6/4/2011

Ground Elevation AMSL (ft): 5344.0
Y Coordinate:
X Coordinate:

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 65% fine to coarse sand; subangular; 35% fine gravel to 3cm; subrounded; no odor. | | | |
| 215 | | | | | Same as above (210 ft). | | | Kelly down @ 0950. New 20' connection @ 0959. Resumed drilling @ 0959. |
| 220 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% fine to coarse sand; rounded; 10% fine gravel to 2cm; rounded; no odor. | | Bentonite Seal | |
| 225 | | | | | Same as above (220 ft); 95% fine to coarse sand; rounded; 5% fine gravel to 3cm; rounded; abundant tuff; no odor. | SW | | |
| 230 | | | | | Same as above (220 ft); 100% fine to coarse sand; rounded. | | | |
| 235 | | | | | Same as above (220 ft); trace fine gravel to 1cm; rounded. | | Top of Filter Pack | Kelly down @ 1006. New 10' connection @ 1015. Resumed drilling @ 1015. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106123

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/31/2011
Date TD Reached: 6/2/2011
Date Completed: 6/4/2011

Ground Elevation AMSL (ft): 5344.0
Y Coordinate:
X Coordinate:

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 60% fine gravel to 1cm; rounded; 40% fine to coarse sand; rounded; no odor. Note: gravel is composed of basalt. | GP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 245 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); dry; dense; 70% fine to coarse sand; rounded; 30% fine gravel to 2cm; rounded; no odor. | SW | | Kelly down @ 1019. New 10' connection @ 1046. Resumed drilling @ 1046. Blow counts (247-248.5'): 50/45. |
| | | SB0223 | 0.0 | | | | | |
| 250 | | | | | Lean CLAY (CL); greenish gray (GLEY1 6/1); dry; very stiff; medium plasticity; 100% clay; no odor. | CL | Bottom of Screen | |
| 255 | | | | | Same as above (250 ft); brown (10YR 5/3). | | | Kelly down @ 1052. New 20' connectioin @ 1100. Resumed drilling @ 1100. |
| 260 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; rounded; no odor. | SW | Bentonite Seal | |
| 265 | | | | | SILT (ML); brown (7.5YR 5/3); damp; stiff; non to low plasticity; 100% silt; no odor. | ML | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106123

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/31/2011
Date TD Reached: 6/2/2011
Date Completed: 6/4/2011

Ground Elevation AMSL (ft): 5344.0
Y Coordinate:
X Coordinate:

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 100% fine to coarse sand; rounded; trace fine gravel to 1cm; no odor. | | | |
| 275 | | | | | Same as above (270 ft). | SW | | Kelly down @ 1106. New 20' connection @ 1130. Resumed drilling @ 1132. |
| 280 | | | | | Lean CLAY (CL); brown (7.5YR 4/3); damp; very stiff; medium plasticity; 100% clay; no odor. | CL | | |
| 285 | | | | | SILT (ML); brown (7.5YR 4/3); damp; stiff; low to medium plasticity; 100% silt; no odor. | | Bentonite Seal | |
| 290 | | | | | SILT (ML); brown (7.5YR 4/3); damp; stiff; nonplastic; 95% silt; 5% fine sand; no odor. | ML | | |
| 295 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; rounded; trace gravel; 5% silt and clay; no odor. | SW | | Kelly down @ 1212. New 20' connection @ 1345. Resumed drilling @ 1345. Blow counts (297-298.5'): 45/50. Blow counts (298.5-300'): 50/2. |
| | | SB0224 | 0.0 | | | | | |
| 300 | | SB0224 | | | | | | |

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# Borehole ID: KAFB-106123

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/31/2011
Date TD Reached: 6/2/2011
Date Completed: 6/4/2011

Ground Elevation AMSL (ft): 5344.0
Y Coordinate:
X Coordinate:

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; trace gravel; no odor. | | | |
| 305 | | | | | Same as above (300 ft); 85% fine to coarse sand; subrounded to rounded; 10% fine gravel to 2cm; rounded; 5% silt and clay; no odor. | SW | | |
| 310 | | | | | Poorly graded GRAVEL with Sand (GP); dry; dense; 65% fine gravel to 3cm; subrounded; 35% fine to coarse sand; subangular; trace clay nodules; no odor. | GP | | |
| 315 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 95% fine to medium sand; subangular; 5% silt and clay; no odor. | SP | Bentonite Seal | Insufficient cuttings, description likely inaccurate. Kelly down @ 1402. New 20' connection @ 1412. Resumed drilling @ 1412. |
| 320 | | | | | Poorly graded GRAVEL (GP); brown (10YR 4/3); dry; dense; 95% fine gravel to 3cm; 5% fine to coarse sand; no odor. Note: gravel is composed of basalt. | | | |
| 325 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 80% fine gravel to 3.5cm; rounded; 20% fine to coarse sand; subrounded; no odor. Note: gravel is composed of basalt. | GP | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106123

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/31/2011
Date TD Reached: 6/2/2011
Date Completed: 6/4/2011

Ground Elevation AMSL (ft): 5344.0
Y Coordinate:
X Coordinate:

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 55% fine to coarse sand; subrounded to rounded; 45% fine gravel; rounded; no odor. | | Bentonite Seal | |
| 335 | | | | | Same as above (330 ft). | SW | Top of Filter Pack | Kelly down @ 1440. New 10' connection @ 1450. Resumed drilling @ 1451. |
| 340 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 345 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 95% fine to medium sand; trace coarse sand; 5% silt and clay; no odor. | SP | | Kelly down @ 1459. New 10' connection @ 1526. Resumed drilling @ 1526. Blow counts (347-348.5'): 35/25. |
| | | SB0225 | 0.0 | | | | | |
| 350 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 55% fine to coarse sand; subrounded to rounded; 45% fine gravel; rounded; no odor. | SW | Bottom of Screen | |
| 355 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 60% fine gravel to 3.5cm; 40% fine to coarse sand; subrounded; no odor. Note: gravel is composed of basalt. | GP | Bentonite Seal | Kelly down @ 1537. New 20' connection @ 1545. Resumed drilling @ 1545. |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106123

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/31/2011
Date TD Reached: 6/2/2011
Date Completed: 6/4/2011

Ground Elevation AMSL (ft): 5344.0
Y Coordinate:
X Coordinate:

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Poorly graded GRAVEL (GP); brown (10YR 4/3); dry; dense; 90% fine gravel to 2.5cm; rounded; 10% coarse sand; subrounded; no odor. Note: gravel is composed of basalt. | | | |
| 365 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 80% fine gravel to 2cm; rounded; 20% fine to coarse sand; subrounded; no odor. Note: gravel is composed of basalt. | GP | | |
| 370 | | | | | Silty GRAVEL (GM); brown (10YR 4/3); dry; dense; 70% fine gravel to 3cm; rounded; 10% coarse sand; rounded; 20% silt nodules; no odor. Note: gravel is composed of basalt. | GM | | |
| 375 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; no odor. | | Bentonite Seal | Kelly down @ 1602. New 20' connection @ 1637. Resumed drilling @ 1637. |
| 380 | | | | | Same as above (375 ft); 95% fine to coarse sand; rounded; 5% fine gravel to 1cm; rounded. | SW | | |
| 385 | | | | | Same as above (375 ft). | | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106123

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/31/2011
Date TD Reached: 6/2/2011
Date Completed: 6/4/2011

Ground Elevation AMSL (ft): 5344.0
Y Coordinate:
X Coordinate:

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; rounded; trace gravel; no odor. | SW | | |
| 395 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; rounded; trace coarse sand; no odor. | SP | | Kelly down @ 1707. End of 6/1/11. New 20' connection @ 0958 on 6/2/11. Resumed drilling @ 0958. Blow counts (397-398.5'): 30/35. Blow counts (398.5-400'): 20/25. |
| | | SB0226 | 0.0 | | | | | |
| 400 | | SB0227 | 0.0 | | | | | |
| 405 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; trace fine gravel to 1cm; subangular; no odor. Same as above (400 ft); grading finer. | SW | Bentonite Seal | |
| 410 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; trace coarse sand; angular to subangular; no odor. | | | |
| 415 | | | | | Same as above (410 ft); abundant mica flakes. | SP | | Kelly down @ 1035. New 20' connection @ 1305. Resumed drilling @ 1306. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106123

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/31/2011
Date TD Reached: 6/2/2011
Date Completed: 6/4/2011

Ground Elevation AMSL (ft): 5344.0
Y Coordinate:
X Coordinate:

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; trace coarse sand; angular; no odor. | | | |
| 425 | | | | | Same as above (420 ft). | | Bentonite Seal | |
| 430 | | | | | Same as above (420 ft); 100% very fine sand. | SP | Top of Filter Pack<br>Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 435 | | | | | Same as above (420 ft); 100% fine to medium sand; angular. | | | Kelly down @ 1346. New 10' connection @ 1356. Resumed drilling @ 1356. |
| 440 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular; no odor. | SW | Bottom of Screen | |
| 445 | | | | | SILT with Gravel (ML); light brown (7.5YR 6/3); dry; nonplastic; 80% silt; 20% fine gravel to 3cm; rounded; no odor. | ML | | |
| | | SB0228 | 0.0 | | | | | Blow counts (447-448.5'): 50/60. Total depth = 447 ft. Reached @ 1415 on 6/2/11. |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106123

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 5/31/2011
Date TD Reached: 6/2/2011
Date Completed: 6/4/2011

Ground Elevation AMSL (ft): 5344.0
Y Coordinate:
X Coordinate:

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | Water added during drilling (gallons) = 0 |
| | | | | | | | | Water added after drilling (gallons) = 0 |
| 455 | | | | | | | | |
| | | | | | | | | Water added during construction (gallons) = Not recorded. |
| 460 | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 465 | | | | | | | | |
| 470 | | | | | | | | |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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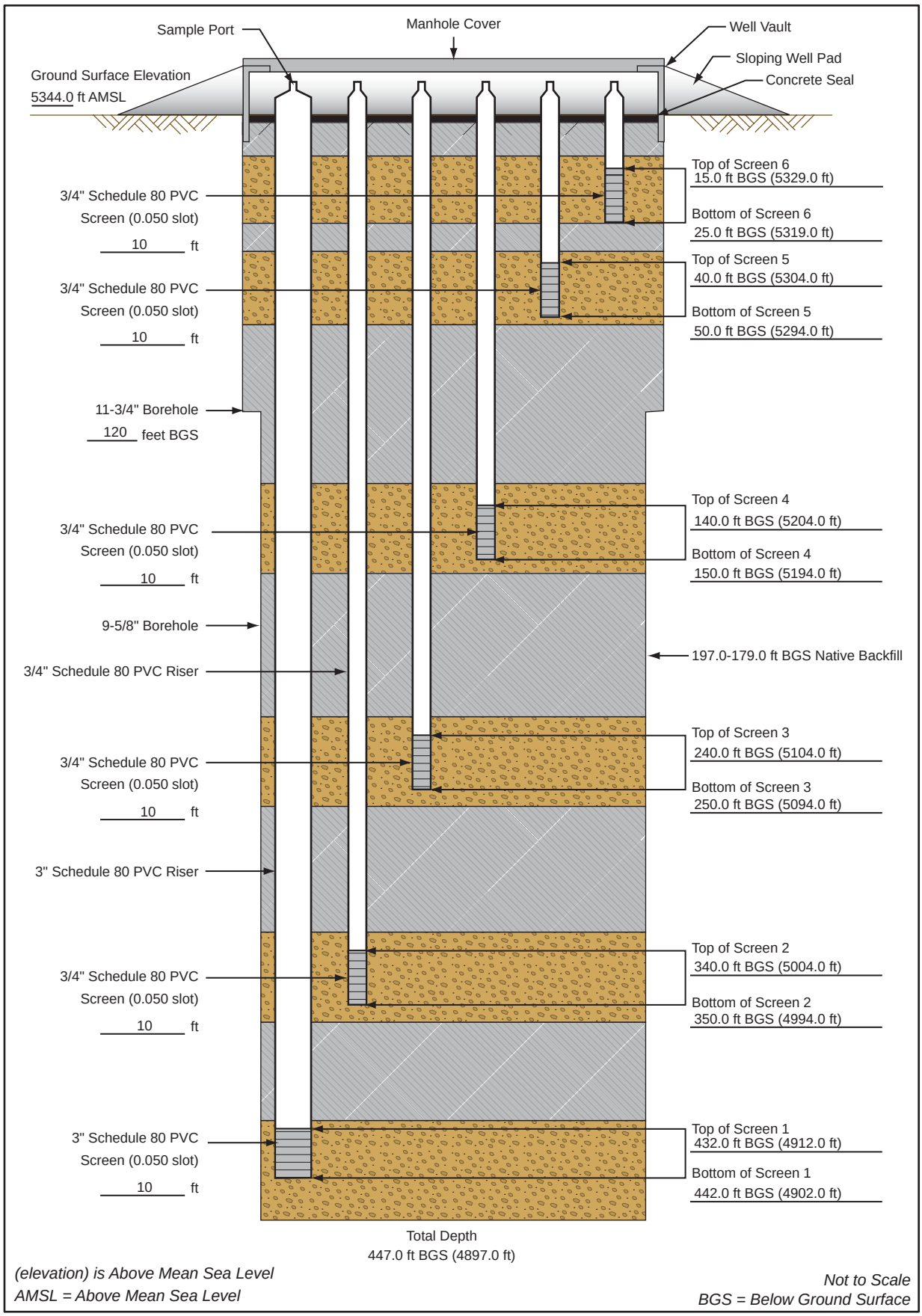
# Nested Soil Vapor Well Completion Diagram for KAFB-106123

Installation Start Date/Time: 6/02/2011 @ 16:45
Installation End Date/Time: 6/04/2011 @ 17:30



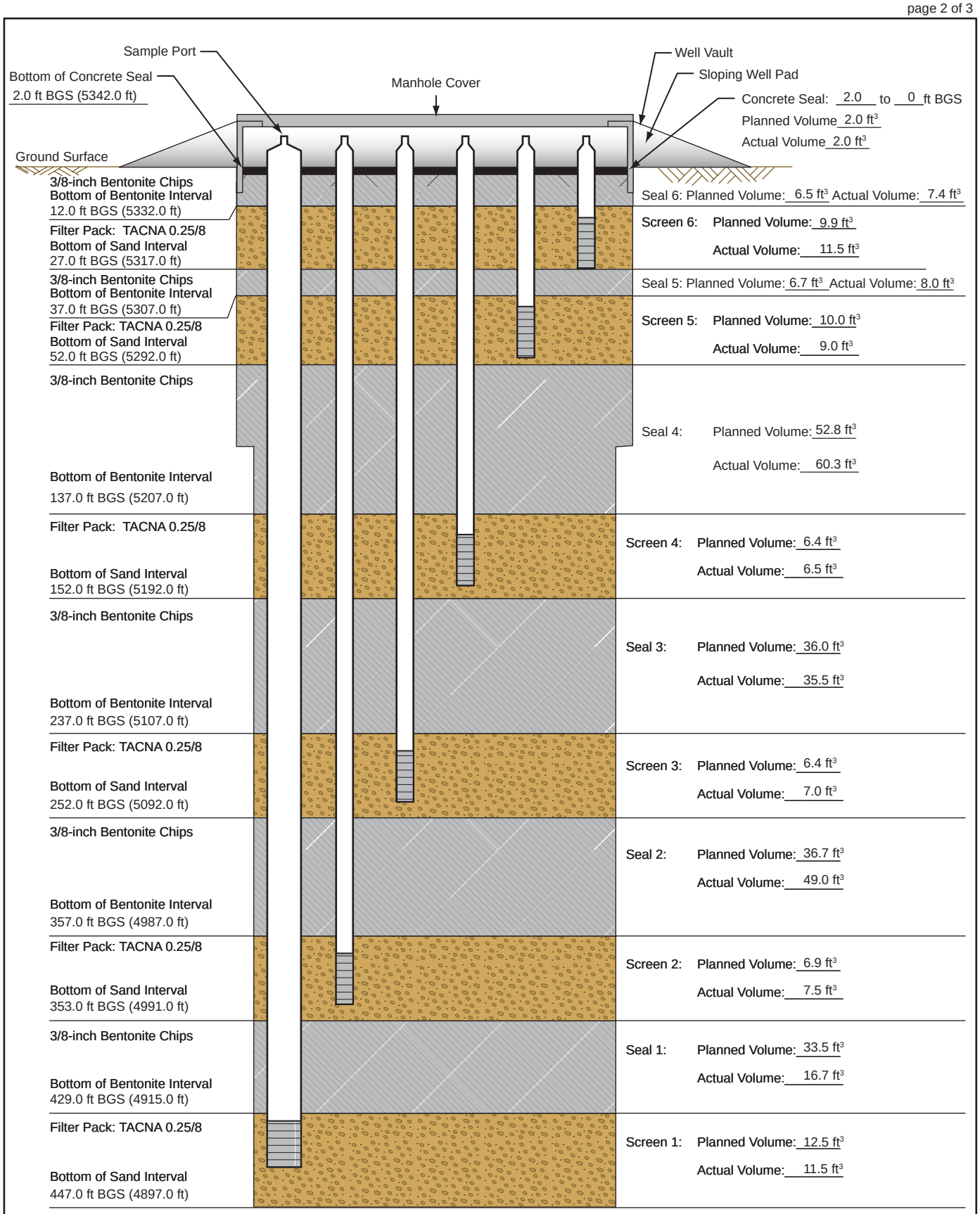



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106123






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106123



Top of Well Vault Elevation: 5344.2 (ft)

Northing: 1472850.95

Easting: 1542010.50

| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106123-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1472850.41 | 1542010.82 | 5343.7 |
| KAFB-106123-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1472850.68 | 1542010.70 | 5343.8 |
| KAFB-106123-150 | 3/4 | 150.0 | 140.0 - 150.0 | 1472850.66 | 1542010.34 | 5343.8 |
| KAFB-106123-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1472850.35 | 1542010.28 | 5343.8 |
| KAFB-106123-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1472850.17 | 1542010.56 | 5343.7 |
| KAFB-106123-442 | 3 | 442.0 | 432.0 - 442.0 | 1472850.56 | 1542010.51 | 5343.7 |

# Borehole ID: KAFB-106124

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/19/2011
Date TD Reached: 6/22/2011
Date Completed: 6/27/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472804.54
X Coordinate: 1542370.17

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | SILT (ML); light brown (7.5YR 6/4); dry; soft; nonplastic; 90% silt; 10% fine to coarse sand; angular; abundant caliche nodules; no odor. | | Concrete Seal | Hand augered. |
| 5 | | | | | Same as above (0 ft); 95% silt; 5% fine to coarse sand; no odor. | | Bentonite Seal | Began drilling @ 1418 on 6/19/11. |
| | | SB0229 | 0.0 | | | | | Blow counts (7-8.5'): 23/24. |
| 10 | | SB0229 | | | | | | Blow counts (8.5-10'): 21/23. |
| | | | | | SILT (ML); brown (7.5YR 5/4); damp; soft; nonplastic; 100% silt; trace gravel. | | Top of Filter Pack | |
| 15 | | | | | SILT (ML); light brown (7.5YR 6/4); dry; soft; nonplastic; 90% silt; 10% fine to coarse sand; angular; abundant caliche nodules; no odor. | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1452. New 10' connection @ 1512. Resumed drilling @ 1513. Blow counts (17-18.5'): 35/60. |
| | | SB0230 SB0230-MS SB0230-MSD | 0.0 | | | | | |
| 20 | | | | | Same as above (15 ft); trace coarse sand; caliche coating on sand. | | | |
| 25 | | | | | SILT with Sand (ML); brown (10YR 5/4); dry; stiff; nonplastic; 85% silt; 15% fine to coarse sand; angular; no odor. | | Bottom of Screen | Kelly down @ 1521. New 10' connection @ 1546. Resumed drilling @ 1546. Blow counts (27-28.5'): 40/50. |
| | | SB0231 | 0.0 | | | | | |
| 30 | | | | | | | Bentonite Seal | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/21/11 14:42 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106124

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/19/2011
Date TD Reached: 6/22/2011
Date Completed: 6/27/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472804.54
X Coordinate: 1542370.17

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); brown (7.5YR 5/4); dry; stiff; nonplastic; 100% silt; no odor. | | Bentonite Seal | |
| 35 | | | | | Same as above (30 ft); light brown (7.5YR 6/4); 95% silt; 5% coarse sand; angular; no odor. | | Top of Filter Pack | Kelly down @ 1600. New 10' connection @ 1618. Resumed drilling @ 1618. Blow counts (37-38.5'): 60/75. |
| | | SB0232 | 0.0 | | | | | |
| 40 | | | | | Sandy SILT (ML); strong brown (7.5YR 5/6); dry; stiff; nonplastic; 70% silt; 30% fine to coarse sand; angular; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 45 | | | | | SILT with Sand (ML); brown (7.5YR 5/3); dry; stiff; nonplastic; 85% silt; 15% fine to coarse sand; angular; no odor. Note: sand is granitic. | ML | | Kelly down @ 1626. End of 6/19/11. New connection @ 1014 on 6/20/11. Resumed drilling @ 1014. Blow counts (47-48.5'): 50/50. Blow counts (48.5-50'): Not recorded. |
| | | SB0233 | 0.0 | | | | | |
| | | SB0234 | 0.0 | | | | | |
| 50 | | | | | SILT with Sand (ML); strong brown (7.5YR 5/6); dry; very soft; nonplastic; 85% silt with clay; 15% fine to very coarse sand; subangular; no odor. | | Bottom of Screen | |
| 55 | | | | | Same as above (50 ft). | | Bentonite Seal | |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106124

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/19/2011
Date TD Reached: 6/22/2011
Date Completed: 6/27/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472804.54
X Coordinate: 1542370.17

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT with Sand (ML); strong brown (7.5YR 5/6); dry; very soft; nonplastic; 85% silt; 15% fine to very coarse sand; subangular; no odor. | | | |
| 65 | | | | | Same as above (60 ft). | | | |
| 70 | | | | | Sandy SILT (ML); strong brown (7.5YR 5/6); dry; very soft; nonplastic; 50% silt with clay; 50% fine to very coarse sand; subangular; no odor. | | | Kelly down @ 1022. New 20' connection @ 1034. |
| 75 | | | | | Same as above (70 ft). | ML | Bentonite Seal | |
| 80 | | | | | SILT with Sand (ML); strong brown (7.5YR 5/6); dry; very soft; nonplastic; 80% silt; 20% fine to very coarse sand; subangular; no odor. | | | |
| 85 | | | | | Gravelly SILT (ML); strong brown (7.5YR 5/6); dry; very soft; nonplastic; 50% silt; 50% fine gravel; subangular; no odor. Note: gravel is quartz. | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106124

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/19/2011
Date TD Reached: 6/22/2011
Date Completed: 6/27/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472804.54
X Coordinate: 1542370.17

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Lean CLAY (CL); brown (7.5YR 5/3); dry; very soft; low plasticity; 95% clay with silt; 5% coarse sand; no odor. | CL | | Kelly down @ 1042. New 10' connection @ 1055. |
| 95 | | | | | Same as above (90 ft). | | | |
| | | SB0235 | 0.1 | | | | | Blow counts (97-98.5'): 40/45. |
| 100 | | | | | Silty SAND (SM); brown (7.5YR 5/4); dry; very loose; 70% very fine sand; 5% coarse sand; subangular; 25% silt; nonplastic; no odor. | SM | | Kelly down @ 1113. New 20' connection @ 1137. |
| 105 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); dry; very loose; 95% very fine sand; 5% coarse to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SP | Bentonite Seal | |
| 110 | | | | | Silty SAND (SM); brown (7.5YR 5/3); dry; very loose; 85% fine to very coarse sand; subangular to subrounded; 15% silt; nonplastic; no odor. | SM | | |
| 115 | | | | | SILT (ML); strong brown (7.5YR 5/6); dry; very soft; low plasticity; 99% silt; trace clay; 1% gravel; subrounded; no odor. Note: gravel is composed of quartz. | ML | | |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106124

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/19/2011
Date TD Reached: 6/22/2011
Date Completed: 6/27/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472804.54
X Coordinate: 1542370.17

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT (ML); strong brown (7.5YR 5/6); dry; very soft; low plasticity; 99% silt; trace clay; 1% coarse sand; subangular; no odor. | | | Kelly down. Total depth with 11-3/4" casing. New 20' connection and resumed drilling with 9-5/8" casing @ 1422. |
| 125 | | | | | Same as above (120 ft). | | | |
| 130 | | | | | Same as above (120 ft). | ML | Bentonite Seal | |
| 135 | | | | | Same as above (120 ft). | | Top of Filter Pack | |
| 140 | | | | | Same as above (120 ft). | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1433. End of 6/20/11. New 10' connection @ 1038 on 6/21/11. |
| 145 | | | | | Silty SAND (SM); light yellowish brown (10YR 6/4); dry; very loose; 80% fine sand; subrounded; 20% silt with clay; slightly cohesive. | SM | | |
| | | SB0236 | 0.0 | | | | | Blow counts (147-148.5'): 45/50. |
| 150 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 6/4); dry; very loose; 95% medium sand; 5% coarse | SP | | |

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# Borehole ID: KAFB-106124

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/19/2011
Date TD Reached: 6/22/2011
Date Completed: 6/27/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472804.54
X Coordinate: 1542370.17

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | sand; trace silt and clay. | | Bottom of Screen | Kelly down @ 1048. New 10' connection @ 1120. |
| | | | | | Well graded SAND (SW); brown (7.5YR 4/4); dry; very loose; 100% fine to coarse sand; subrounded; trace silt and clay; noncohesive; no odor. | SW | | |
| 155 | | | | | SILT (ML); strong brown (7.5YR 5/6); dry; very soft; 95% silt; 5% coarse sand; subangular; slightly cohesive. | ML | | |
| 160 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); dry; very loose; 97% fine sand; 3% coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SP | | Kelly down @ 1127. New 20' connection @ 1141. |
| 165 | | | | | Well graded SAND (SW); brown (10YR 5/4); dry; very loose; 95% fine to very coarse sand; subangular to subrounded; 5% gravel; trace silt and clay; noncohesive; no odor. Note: gravel is composed of quartz and sandstone. | | Bentonite Seal | |
| 170 | | | | | Same as above (161 ft). | SW | | |
| 175 | | | | | Same as above (161 ft). | | | |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106124

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/19/2011
Date TD Reached: 6/22/2011
Date Completed: 6/27/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472804.54
X Coordinate: 1542370.17

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); dry; very loose; 95% fine sand; 5% coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SP | | Kelly down @ 1146. New 20' connection @ 1200. |
| 185 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); dry; very loose; 100% fine to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SW | | |
| 190 | | | | | Same as above (185 ft). | | | |
| 195 | | | | | Poorly graded SAND (SP); light yellowish brown (10YR 6/4); dry; very loose; 97% fine sand; 3% gravel; subrounded; trace silt and clay; noncohesive; no odor. Note: gravel is composed of quartz. | SP | Bentonite Seal | |
| | | SB0237 | 0.0 | | | | | Blow counts (197-198.5'): 40/50. |
| 200 | | | | | Same as above (195 ft); grading coarser. | | | Kelly down @ 1225. New 20' connection @ 1322. |
| 205 | | | | | Same as above (195 ft). | | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106124

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/19/2011
Date TD Reached: 6/22/2011
Date Completed: 6/27/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472804.54
X Coordinate: 1542370.17

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Clayey GRAVEL (GC); yellowish brown (10YR 5/4); dry; loose; 80% fine gravel; subangular; 20% clay; low plasticity; cohesive; no odor. Note: gravel is composed of quartz and sandstone. | GC | | |
| 215 | | | | | Poorly graded SAND (SP); very pale brown (10YR 7/3); dry; loose; 99% fine sand; 1% gravel; subrounded; trace silt and clay; non cohesive; no odor. | SP | | |
| 220 | | | | | Same as above (213 ft). | | | Kelly down @ 1330. New 20' connection @ 1342. |
| 225 | | | | | | | Bentonite Seal | |
| 230 | | | | | Well graded SAND (SW); light brownish gray (10YR 6/2); dry; loose; 100% fine to very coarse sand; subangular. Same as above (225 ft); 2% gravel. Note: gravel is composed of quartz and sandstone. | SW | | |
| 235 | | | | | Poorly graded SAND (SP); lense. | SP | | |
| 240 | | | | | Well graded SAND (SW); light brownish gray (10YR 6/2); dry; loose; 98% fine to very coarse sand; subangular; 2% gravel. Note: gravel is composed of quartz and sandstone. | SW | Top of Filter Pack | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/21/11 14:42 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106124

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/19/2011
Date TD Reached: 6/22/2011
Date Completed: 6/27/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472804.54
X Coordinate: 1542370.17

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND (SP); light brownish gray (10YR 6/2); dry; loose; 90% fine sand; 10% coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1349. New 10' connection @ 1402. |
| 245 | | | | | Same as above (240 ft); 2% gravel. Note: gravel is composed of quartz and sandstone. | | | |
| | | SB0238 | 0.0 | | | | | Blow counts (247-248.5'): 40/60. |
| 250 | | | | | Same as above (240 ft). | | Bottom of Screen | Kelly down @ 1409. New 10' connection @ 1447. |
| 255 | | | | | Same as above (240 ft). | | | |
| 260 | | | | | SILT (ML); brown (7.5YR 5/4); dry; soft; low plasticity; 99% silt; 1% coarse sand; cohesive; no odor. | ML | Bentonite Seal | Kelly down @ 1453. New 20' connection @ 1509. |
| | | | | | Same as above (257 ft); nonplastic. | | | |
| 265 | | | | | Same as above (257 ft); strong brown (7.5YR 4/6). | | | |
| 270 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/21/11 14:42 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106124

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/19/2011
Date TD Reached: 6/22/2011
Date Completed: 6/27/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472804.54
X Coordinate: 1542370.17

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; loose; 100% fine sand; subangular; trace silt and clay; noncohesive; no odor. | SP | | |
| 275 | | | | | Same as above (270 ft); 95% fine sand; 5% coarse sand. | | | |
| | | | | | SILT (ML); pinkish gray (7.5YR 6/2); lense. | ML | | |
| 280 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; loose; 100% coarse sand; subangular; trace silt and clay; noncohesive; no odor. | SP | | Kelly down @ 1519. New 20' connection @ 1551. |
| 285 | | | | | Well graded SAND (SW); pinkish gray (7.5YR 6/2); dry; medium dense; 100% fine to coarse sand; subangular; trace silt and clay; noncohesive; no odor. | SW | Bentonite Seal | |
| 290 | | | | | Lean CLAY (CL); brown (7.5YR 4/4); dry; firm; medium plasticity; 99% clay with some silt; 1% coarse sand; subangular; no odor. | CL | | |
| 295 | | | | | Same as above (289 ft). | | | |
| | | SB0239 | 0.0 | | | | | Blow counts (297-298.5'): 32/50. |
| 300 | | | | | Well graded SAND (SW); brown (7.5YR 5/4); dry; medium dense; 99% fine to very coarse sand; 1% gravel; | SW | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/21/11 14:42 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106124

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/19/2011
Date TD Reached: 6/22/2011
Date Completed: 6/27/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472804.54
X Coordinate: 1542370.17

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | subangular; trace silt and clay; noncohesive. | | | Kelly down @ 1606. New 20' connection @ 1637. |
| | | | | | Well graded SAND (SW); pinkish gray (7.5YR 6/2); dry; medium dense; 100% fine to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | | | |
| 305 | | | | | Same as above (300 ft). | SW | | |
| 310 | | | | | Same as above (300 ft). | | | |
| 315 | | | | | Well graded GRAVEL (GW); brown (7.5YR 5/4); dry; medium dense; 100% fine to coarse gravel; subangular to subrounded; trace silt and clay; noncohesive; no odor. Note: gravel is composed of quartz and sandstone. | | Bentonite Seal | |
| 320 | | | | | Same as above (313 ft). | GW | | Kelly down @ 1646. New 20' connection @ 1653. |
| 325 | | | | | Same as above (313 ft). | | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/21/11 14:42 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106124

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/19/2011
Date TD Reached: 6/22/2011
Date Completed: 6/27/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472804.54
X Coordinate: 1542370.17

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded GRAVEL (GW); brown (7.5YR 5/3) dry; medium dense; 100% fine to coarse gravel; subangular to subrounded; trace silt and clay; noncohesive. Note: gravel is composed of quartz and sandstone. | | Bentonite Seal | |
| 335 | | | | | Same as above (330 ft). | GW | Top of Filter Pack | |
| 340 | | | | | Well graded SAND (SW); strong brown (7.5YR 5/6); dry; medium dense; 100% fine to very coarse sand; subangular; trace silt and clay; noncohesive; no odor. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1701. End of 6/21/11. New 10' connection @ 0838 on 6/22/11. |
| 345 | | | | | Poorly graded SAND (SW); yellowish brown (10YR 5/6); dry; medium dense; 98% fine sand; 2% coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | | | |
| | | SB0240 SB1745 | 0.0 | | | | | Blow counts (347-348.5'): 45/60. |
| 350 | | | | | Same as above (344 ft); 5% coarse to very coarse sand. | SP | Bottom of Screen | Kelly down @ 0845. New 10' connection @ 0928. |
| 355 | | | | | Same as above (344 ft). | | Bentonite Seal | |
| 360 | | | | | Well graded SAND (SW); dark yellowish | SW | | |

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# Borehole ID: KAFB-106124

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/19/2011
Date TD Reached: 6/22/2011
Date Completed: 6/27/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472804.54
X Coordinate: 1542370.17

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | brown (10YR 4/6); dry; medium dense; 100% fine to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | | | Kelly down @ 0934. New 20' connection @ 0944. |
| 365 | | | | | Same as above (359 ft). | SW | | |
| 370 | | | | | Well graded GRAVEL (GW); light brownish gray (10YR 6/2); dry; medium dense; 100% coarse gravel; subangular to subrounded; trace silt and clay; noncohesive; no odor. Note: gravel is composed of quartz and sandstone. | | | |
| 375 | | | | | Same as above (369 ft). | GW | Bentonite Seal | |
| 380 | | | | | Poorly graded SAND (SP); grayish brown (10YR 5/2); dry; dense; 100% very coarse sand; subangular; trace silt and clay; noncohesive; no odor. | SP | | Kelly down @ 0953. New 20' connection @ 1005. |
| 385 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SW | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106124

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/19/2011
Date TD Reached: 6/22/2011
Date Completed: 6/27/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472804.54
X Coordinate: 1542370.17

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 95% fine to very coarse sand; 5% gravel; subangular to subrounded; trace silt and clay; noncohesive; no odor. Note: gravel is composed of quartz and sandstone. | SW | | |
| 395 | | | | | Poorly graded SAND (SP); very pale brown (10YR 7/3); dry; dense; 98% fine sand; 2% coarse sand; subangular to subrounded; trace silt and clay; noncohesive. | SP | | Blow counts (397-398.5'): 25/30. Blow counts (398.5-400'): 10/25. Kelly down @ 1024. New 20' connection @ 1110. |
| | | SB0241 | 0.2 | | | | | |
| 400 | | SB0241 | | | Well graded SAND (SW); light brownish gray (10YR 6/2); dry; very dense; 100% fine to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SW | | |
| 405 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); dry; very dense; 95% fine sand; 5% coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | | Bentonite Seal | |
| 410 | | | | | Same as above (405 ft). | SP | | |
| 415 | | | | | Same as above (405 ft); very fine sand. Note: 6 inch lean clay lense at 419'. | | | |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106124

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/19/2011
Date TD Reached: 6/22/2011
Date Completed: 6/27/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472804.54
X Coordinate: 1542370.17

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); dry; very dense; 99% very fine sand; 1% coarse sand; subangular to subrounded; trace silt and sand; noncohesive; no odor. | | | Kelly down @ 1131. New 10' connection @ 1144. |
| 425 | | | | | Same as above (420 ft). | SP | | |
| 430 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); dry; very dense; 100% fine to very coarse sand; subangular; trace silt and clay; noncohesive; no odor. | | Bentonite Seal | Kelly down @ 1154. New 10' connection @ 1310. |
| 435 | | | | | Same as above (430 ft). | SW | Top of Filter Pack | |
| 440 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); dry; very dense; 100% fine sand; subangular; trace silt and clay; noncohesive; no odor. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1318. New 10' connection @ 1330. |
| 445 | | | | | Same as above (440 ft). | SP | | |
| | X | SB0242 | 0.0 | | | | | Blow counts (447-448.5'): 12/10. |
| 450 | X | SB0242 | | | Same as above (440 ft); coarse sand. | | | Blow counts (448.5-450'): 25/40. |

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# Borehole ID: KAFB-106124

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/19/2011
Date TD Reached: 6/22/2011
Date Completed: 6/27/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472804.54
X Coordinate: 1542370.17

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | |
| | | SB0242 | | | Well graded GRAVEL (GW); gray (10YR 6/1); dry; very dense; 100% fine to coarse gravel; subangular to subrounded; trace silt and clay; noncohesive. Note: gravel is composed of quartz, chert, and sandstone. | GW | Bottom of Screen | Blow counts (450-451.5'): 15/30. Kelly down @ 1339. New 10' connection @ 1400. |
| 455 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); dry; very dense; 100% coarse sand; subangular; trace silt and clay; noncohesive. | SP | | |
| 460 | | | | | Well graded GRAVEL (GW); gray (10YR 6/1); dry; very dense; 100% fine to very coarse gravel; subangular to subrounded; trace silt and clay; noncohesive. | GW | Bottom of Filter Pack<br>Native Backfill | Total depth = 460 ft. Reached @ 1452 on 6/22/11. |
| 465 | | | | | | | | Water added during drilling (gallons) = 0 |
| | | | | | | | | Water added after drilling (gallons) = 0 |
| 470 | | | | | | | | Water added during construction (gallons) = 0 |
| 475 | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 480 | | | | | | | | |

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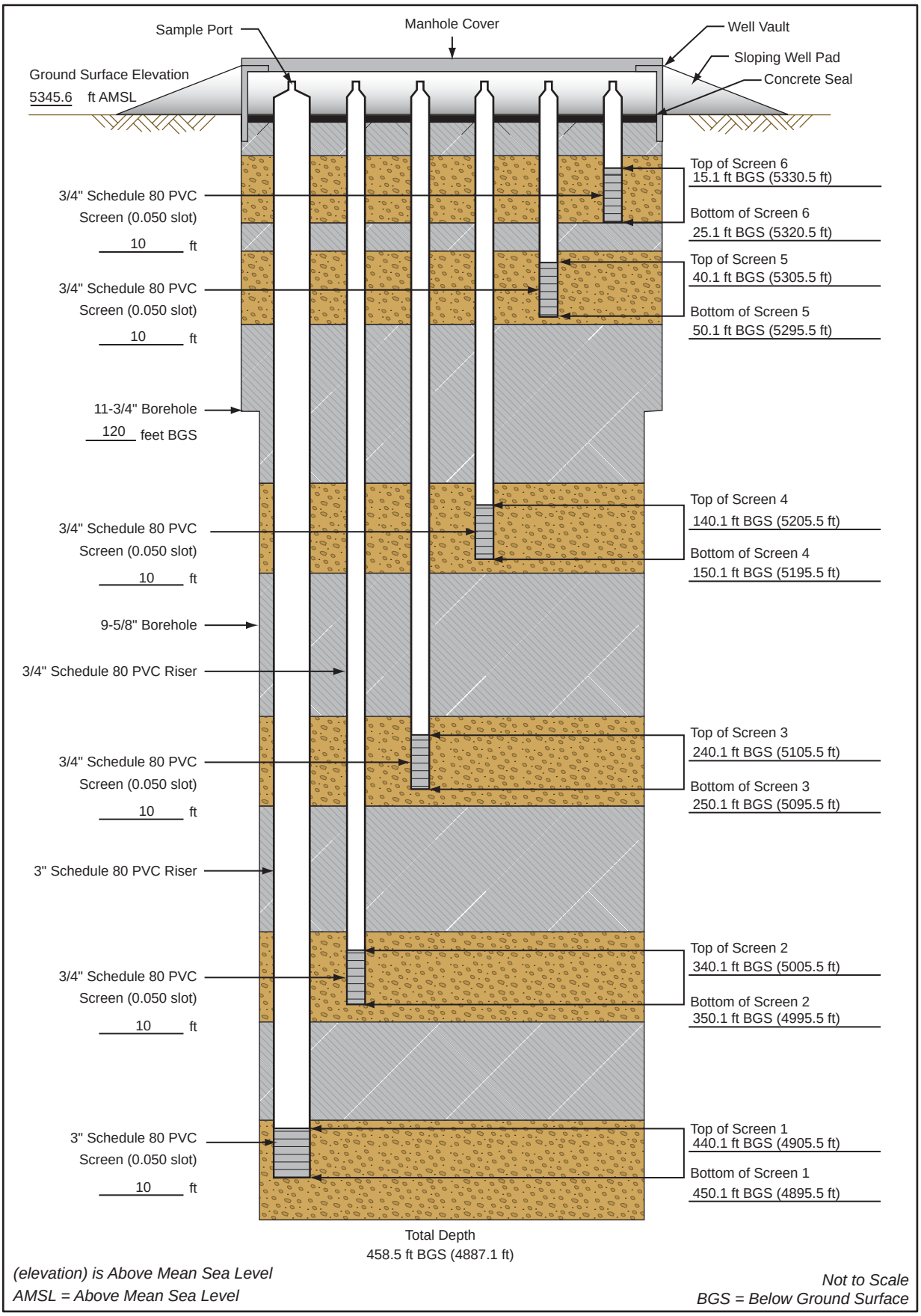
# Nested Soil Vapor Well Completion Diagram for KAFB-106124

Installation Start Date/Time: 6/22/2011 @ 14:18
Installation End Date/Time: 6/27/2011 @ 14:52



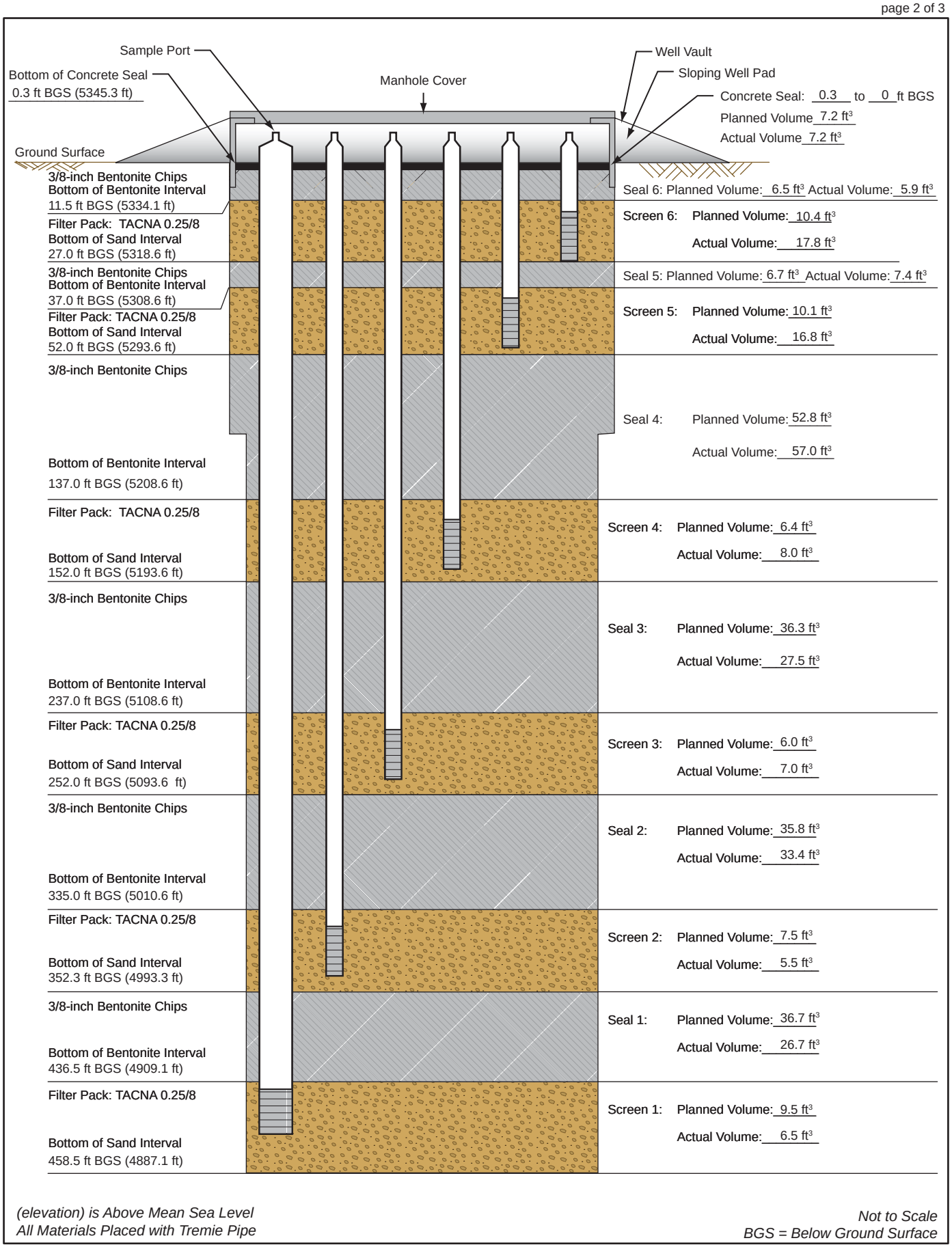



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106124






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

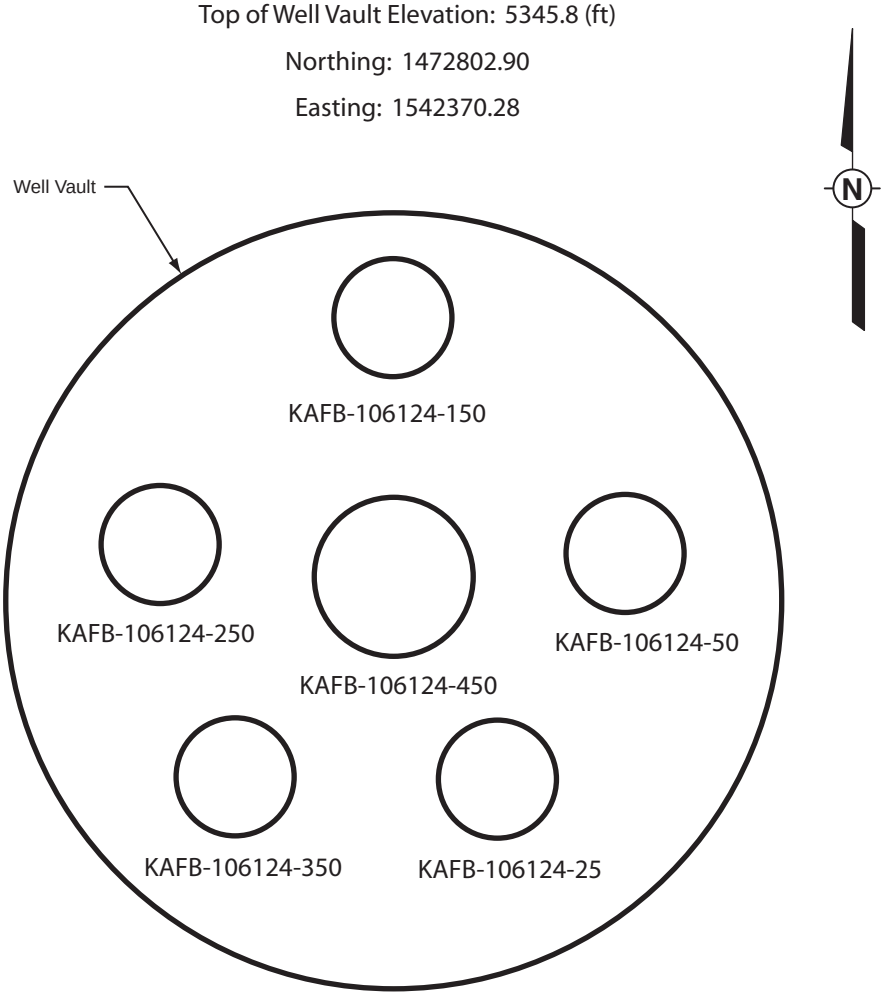
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106124



Top of Well Vault Elevation: 5345.8 (ft)

Northing: 1472802.90

Easting: 1542370.28




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106124-25 | 3/4 | 25.1 | 15.1 - 25.1 | 1472802.58 | 1542370.42 | 5345.5 |
| KAFB-106124-50 | 3/4 | 50.1 | 40.1 - 50.1 | 1472802.60 | 1542370.11 | 5345.5 |
| KAFB-106124-150 | 3/4 | 150.1 | 140.1 - 150.1 | 1472802.34 | 1542369.98 | 5345.5 |
| KAFB-106124-250 | 3/4 | 250.1 | 240.1 - 250.1 | 1472802.14 | 1542370.22 | 5345.5 |
| KAFB-106124-350 | 3/4 | 350.1 | 340.1 - 350.1 | 1472802.27 | 1542370.46 | 5345.4 |
| KAFB-106124-450 | 3 | 450.1 | 440.1 - 450.1 | 1472802.50 | 1542370.24 | 5345.5 |

# Borehole ID: KAFB-106125

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/27/2011
Date TD Reached: 7/6/2011
Date Completed: 7/10/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472871.83
X Coordinate: 1542444.61

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | SILT (ML); reddish brown (5YR 5/3); dry; very soft; nonplastic; 90% silt; 10% coarse sand; subangular; noncohesive; no odor. | | Concrete Seal; Bentonite Seal; Top of Filter Pack | Hand augered. |
| 5 | | | | | Same as above (0 ft); low plasticity 20% clay. | | | Spud @ 1635 on 6/27/11. |
| | | SB0243 | 0.0 | | | ML | | Blow counts (7-8.5'): 9/16. |
| 10 | | | | | Same as above (0 ft); yellowish red (5YR 4/6). | | | |
| 15 | | | | | Lean CLAY (CL); yellowish red (5YR 5/6); dry; very soft; plastic; 83% clay; 15% silt; 2% coarse sand; subangular; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| | | SB0244 SB0245 | 0.0 | | | CL | | Blow counts (17-18.5'): 25/50. |
| 20 | | | | | Same as above (15 ft). | | | Kelly down @ 1706. End of 6/27/11. New connection @ 0821 on 6/28/11. |
| 25 | | | | | SILT with Gravel (ML); strong brown (7.5YR 4/6); dry; very soft; nonplastic; 80% silt; 20% very coarse sand to gravel; subangular. | ML | Bottom of Screen | |
| | | SB0246 | 0.0 | | Lean CLAY (CL); reddish brown (5YR 4/4); dry; very soft; plastic; 99% clay; 1% coarse sand; subangular. | CL | Bentonite Seal | Blow counts (27-28.5'): 35/40. |
| 30 | | | | | | | | |

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# Borehole ID: KAFB-106125

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/27/2011
Date TD Reached: 7/6/2011
Date Completed: 7/10/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472871.83
X Coordinate: 1542444.61

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Lean CLAY (CL); reddish brown (5YR 4/4); dry; very soft; plastic; 100% clay; trace coarse sand; subangular; no odor. | | | Kelly down @ 0829. New connection @ 0907. |
| | | | | | | | Bentonite Seal | |
| 35 | | | | | Same as above (30 ft); increase in silt content. | | | |
| | | | | | | | Top of Filter Pack | |
| | | SB0247 | 0.0 | | | | | Blow counts (37-38.5'): 20/25. |
| 40 | | | | | Lean CLAY (CL); yellowish red (5YR 4/6); dry; very soft; plastic; 99% clay; 1% coarse sand; subangular; no odor. | CL | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 0913. New connection @ 0934. |
| 45 | | | | | Same as above (40 ft). | | | |
| | | SB0248 SB0248-MS SB0248-MSD | 0.0 | | | | | Blow counts (47-48.5'): 40/50. |
| 50 | | | | | Same as above (40 ft). | | Bottom of Screen | Kelly down @ 0941. New connection @ 1017. |
| 55 | | | | | | | | |
| | | | | | | | Bentonite Seal | |
| 60 | | | | | Clayey SAND (SC); strong brown (7.5YR 4/6); dry; very loose; 80% fine to very coarse sand; subangular; 20% clay; low plasticity; no odor. | SC | | |

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# Borehole ID: KAFB-106125

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/27/2011
Date TD Reached: 7/6/2011
Date Completed: 7/10/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472871.83
X Coordinate: 1542444.61

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | | | | |
| | | | | | Clayey SAND (SC); strong brown (7.5YR 4/6); dry; very loose; 80% fine to very coarse sand; subangular; 20% clay; low plasticity; no odor. | SC | | Kelly down and new 20' connection @ 1033. |
| 65 | | | | | | | | |
| | | | | | Lean CLAY (CL); strong brown (7.5YR 4/6); dry; very soft; low plasticity; 70% clay; 30% silt; no odor. | CL | | |
| 70 | | | | | | | | |
| | | | | | Lean CLAY (CL); yellowish red (5YR 4/6); dry; very soft; plastic; 99% clay; 1% coarse sand; subangular; no odor. | | | |
| 75 | | | | | | | Bentonite Seal | |
| | | | | | Clayey SAND (SC); yellowish red (5YR 4/6); dry; very loose; 80% fine to very coarse sand; subangular; 20% clay; low plasticity; no odor. | SC | | |
| 80 | | | | | | | | |
| | | | | | SILT (ML); yellowish red (5YR 4/6); dry; very soft; low plasticity; 79% silt; 20% clay; 1% medium sand; subangular; no odor. | | | Kelly down @ 1041. New 20' connection @ 1050. |
| 85 | | | | | | | | |
| | | | | | Same as above (80 ft). | ML | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106125

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/27/2011
Date TD Reached: 7/6/2011
Date Completed: 7/10/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472871.83
X Coordinate: 1542444.61

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); yellowish red (5YR 4/6); dry; very soft; low plasticity; 79% silt; 20% clay; 1% coarse sand; subangular; no odor. | ML | | |
| 95 | | | | | Lean CLAY (CL); yellowish red (5YR 4/6); dry; soft; plastic; 78% clay; 20% silt; 2% coarse sand; subangular; no odor. | CL | | |
| | | SB0249 | 0.0 | | | | | Blow counts (97-98.5'): 30/55. |
| 100 | | | | | Same as above (95 ft). | | | Kelly down @ 1216. New 20' connection @ 1336. |
| 105 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/8); dry; very loose; 100% fine sand; subrounded; trace silt and clay; noncohesive; no odor. | SP | Bentonite Seal | |
| 110 | | | | | Same as above (103 ft). | | | |
| 115 | | | | | Same as above (103 ft). | | | |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106125

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/27/2011
Date TD Reached: 7/6/2011
Date Completed: 7/10/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472871.83
X Coordinate: 1542444.61

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Lean CLAY (CL); reddish brown (5YR 5/4); dry; very soft; plastic; 84% clay; 15% silt; 1% coarse sand; subangular; no odor. | | | Kelly down @ 1345. Total depth with 11-3/4" casing @ 1345. New 20' connection and resumed drilling with 9-5/8" casing @ 1546. |
| 125 | | | | | Same as above (120 ft). | CL | | |
| 130 | | | | | SILT (ML); strong brown (7.5YR 5/6); dry; very soft; nonplastic; 89% silt; trace clay; 11% coarse sand; cohesive; no odor. | | Bentonite Seal | |
| 135 | | | | | Same as above (130 ft). | ML | Top of Filter Pack | |
| 140 | | | | | Lean CLAY (CL); yellowish red (5YR 4/6); dry; very soft; plastic; 80% clay; 20% silt; trace coarse sand; subangular; no odor. | CL | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1628. New connection @ 1636. |
| 145 | X | SB0250 | 0.0 | | Poorly graded SAND (SP); pale brown (10YR 6/3); dry; very loose; 99% fine sand; 1% coarse sand; subangular to subrounded; trace silt and clay; noncohesive. | SP | | Blow counts (147-148.5'): 50/50. |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106125

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/27/2011
Date TD Reached: 7/6/2011
Date Completed: 7/10/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472871.83
X Coordinate: 1542444.61

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | SILT (ML); strong brown (7.5YR 4/6); dry; very soft; nonplastic; 100% silt; trace coarse sand; subangular; no odor. | | Bottom of Screen | Kelly down @ 1642. New connection @ 1701. |
| 155 | | | | | Same as above (150 ft). | ML | | |
| 160 | | | | | | | | Kelly down @ 1707. End of 6/28/11. New connection @ 0832 on 6/29/11. |
| 165 | | | | | Well graded GRAVEL (GW); brownish gray (10YR 6/2); dry; very loose; 100% gravel; subangular to subrounded; trace silt and clay; noncohesive; no odor. Note: gravel is composed of quartz and sandstone. | | Bentonite Seal | |
| 170 | | | | | Same as above (161 ft). | GW | | |
| 175 | | | | | Same as above (161 ft). | | | |
| | | | | | Poorly graded SAND (SP); 100% fine sand; trace coarse sand. | SP | | |
| 180 | | | | | Well graded GRAVEL (GW); brownish | GW | | |

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# Borehole ID: KAFB-106125

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/27/2011
Date TD Reached: 7/6/2011
Date Completed: 7/10/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472871.83
X Coordinate: 1542444.61

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | gray (10YR 6/2); dry; very loose; 100% gravel; subangular to subrounded; trace silt and clay; noncohesive; no odor. Note: gravel is composed of quartz and sandstone. | | | Kelly down @ 0841. New 20' connection @ 0847. |
| 185 | | | | | Poorly graded SAND (SP); light brownish gray (10YR 6/2); dry; very loose; 95% fine sand; 5% coarse sand; subangular to subrounded; trace silt and clay; noncohesive. | SP | | |
| 190 | | | | | Same as above (180 ft). | | | |
| 195 | | | | | Same as above (180 ft). | | Bentonite Seal | |
| | | SB0251 | 0.0 | | Well graded SAND (SW); 100% fine to very coarse sand; lense. | SW | | Blow counts (197-198.5'): 50/60. |
| 200 | | | | | Poorly graded SAND (SP); light brownish gray (10YR 6/2); dry; very loose; 95% fine sand; 5% coarse sand; subangular to subrounded; trace silt and clay; noncohesive. | SP | | Kelly down @ 0856. New 20' connection @ 0920. |
| | | | | | Well graded SAND (SW); lense. | SW | | |
| 205 | | | | | Poorly graded SAND (SP); light brownish gray (10YR 6/2); dry; very loose; 95% fine sand; 5% coarse sand; subangular to subrounded; trace silt and clay; noncohesive. | SP | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106125

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/27/2011
Date TD Reached: 7/6/2011
Date Completed: 7/10/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472871.83
X Coordinate: 1542444.61

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | SILT (ML); yellowish brown (10YR 5/6); dry; loose; nonplastic; 99% silt; 1% coarse sand; subangular; no odor. | ML | | |
| 215 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); dry; loose; 98% fine sand; 2% coarse sand; subangular to subrounded; trace silt and clay; no odor. | SP | | |
| 220 | | | | | Same as above (215 ft); 5-10% coarse sand and gravel. Note: gravel is composed of quartz and sandstone. | | | Kelly down @ 0929. New 20' connection @ 0938. |
| | | | | | SILT (ML); lense. | ML | | |
| 225 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); dry; loose; 95% fine sand; 5% coarse sand; subangular to subrounded; trace silt and clay; no odor. Note: gravel is composed of quartz and sandstone. | SP | Bentonite Seal | |
| 230 | | | | | Same as above (223 ft); 5-10% coarse sand and gravel. | | | |
| 235 | | | | | Same as above (223 ft); 5-15% coarse sand and gravel. | | Top of Filter Pack | |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106125

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/27/2011
Date TD Reached: 7/6/2011
Date Completed: 7/10/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472871.83
X Coordinate: 1542444.61

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND (SP); light brownish gray (10YR 6/2); dry; loose; 95% fine sand; 5% coarse sand and gravel; subangular to subrounded; trace silt and clay; noncohesive. Note: gravel is composed of quartz and sandstone. | | - Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 0945. New connection @ 0953. |
| 245 | | | | | Same as above (240 ft). | SP | | |
| | | SB0252 | 0.0 | | | | | Blow counts (247-248.5'): 60/75. |
| 250 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); dry; loose; 98% fine to very coarse sand; 2% gravel; subangular to subrounded; trace silt and clay; noncohesive. Note: gravel is composed of quartz and sandstone. | | - Bottom of Screen | Kelly down @ 0957. New connection @ 1023. |
| 255 | | | | | Same as above (250 ft). | SW | | |
| 260 | | | | | Sandy SILT (ML); yellowish brown (10YR 5/4); dry; soft; nonplastic; 50% silt; 50% very fine sand; subrounded; noncohesive; no odor. | | - Bentonite Seal | Kelly down @ 1031. New 20' connection @ 1043. |
| 265 | | | | | Same as above (260 ft). | ML | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106125

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/27/2011
Date TD Reached: 7/6/2011
Date Completed: 7/10/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472871.83
X Coordinate: 1542444.61

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | SILT (ML); yellowish brown (10YR 5/4); dry; soft; nonplastic; 100% silt; trace coarse sand; subangular; no odor. | | | |
| 275 | | | | | Same as above (270 ft). | | | |
| 280 | | | | | Same as above (270 ft). | ML | | Kelly down @ 1103. New 20' connection @ 1110. |
| 285 | | | | | Same as above (270 ft). | | Bentonite Seal | |
| 290 | | | | | Lean CLAY (CL); reddish brown (5YR 4/3); dry; firm; plastic; 90% clay; 10% silt; trace coarse sand; subangular; no odor. | | | |
| 295 | | | | | Same as above (290 ft). | CL | | |
| | | SB0253 | 0.0 | | | | | Blow counts (297-298.5'): 50/60. |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106125

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/27/2011
Date TD Reached: 7/6/2011
Date Completed: 7/10/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472871.83
X Coordinate: 1542444.61

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Silty SAND (SM); light reddish brown (5YR 6/4); dry; medium dense; 75% coarse sand; subangular to subrounded; 25% silt; noncohesive; no odor. | | | Kelly down @ 1120. End of 6/29/11. New 20' connection @ 0835 on 7/6/11. |
| 305 | | | | | Same as above (300 ft). | SM | | |
| 310 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); dry; medium dense; 100% coarse sand; subangular; trace silt and clay; noncohesive. | SP | | |
| 315 | | | | | Well graded GRAVEL (GW); pinkish gray (7.5YR 6/2); dry; medium dense; 100% fine to coarse gravel; subangular to subrounded; trace silt and clay; noncohesive; no odor. | | Bentonite Seal | |
| 320 | | | | | Same as above (313 ft). | GW | | Kelly down @ 0845. New 20' connection @ 0857. |
| 325 | | | | | Same as above (313 ft). | | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106125

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/27/2011
Date TD Reached: 7/6/2011
Date Completed: 7/10/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472871.83
X Coordinate: 1542444.61

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded GRAVEL (GW); brown (7.5YR 5/2); dry; medium dense; 100% fine to coarse gravel; subangular to subrounded; trace silt and clay; noncohesive; no odor. Note: gravel is composed of quartz and sandstone. | GW | Bentonite Seal | |
| 335 | | | | | Same as above (330 ft). | | Top of Filter Pack | |
| 340 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; medium dense; 100% medium sand; subangular; trace silt and clay; noncohesive; no odor. | SP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 0905. New connection @ 0917. |
| 345 | | | | | Same as above (339 ft). | | | |
| | | SB0254 SB0255 | 0.0 | | | | | Blow counts (347-348.5'): 50/60. |
| 350 | | | | | Well graded SAND (SW); brown (7.5YR 5/2); dry; medium dense; 98% fine to coarse sand; 2% gravel; trace silt and clay. | SW | Bottom of Screen | Kelly down @ 0950. New connection @ 1003. |
| 355 | | | | | Lean CLAY (CL); reddish brown (5YR 4/3); dry; firm; plastic; 100% clay; trace silt; trace coarse sand; subrounded; no odor. Same as above (350 ft). | CL | Bentonite Seal | |
| 360 | | | | | Poorly graded SAND (SP); brown | SP | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/3/11 14:08 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106125

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/27/2011
Date TD Reached: 7/6/2011
Date Completed: 7/10/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472871.83
X Coordinate: 1542444.61

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | (7.5YR 5/4); dry; medium dense; 95% fine sand; 5% coarse to very coarse sand. | | | Kelly down and new 20' connection @ 1021. |
| | | | | | Well graded SAND (SW); brown (7.5YR 5/2); dry; medium dense; 100% fine to very coarse sand; subangular; trace silt and clay; noncohesive; no odor. | | | |
| 365 | | | | | Same as above (360 ft). | SW | | |
| 370 | | | | | Well graded GRAVEL (GW); brown (7.5YR 5/2); dry; medium dense; 100% fine to coarse gravel; subangular to subrounded; trace silt and clay; noncohesive. Note: gravel is composed of quartz and sandstone. | | | |
| 375 | | | | | Same as above (370 ft); dense. | GW | Bentonite Seal | |
| 380 | | | | | Well graded SAND (SW); brown (7.5YR 5/2); dry; dense; 100% fine to very coarse sand; subangular; trace silt and clay; noncohesive; no odor. | SW | | Kelly down @ 1029. New 20' connection @ 1044. |
| 385 | | | | | Well graded GRAVEL (GW); brown (7.5YR 5/2); dry; dense; 100% fine to coarse gravel; subangular to subrounded; trace silt and clay; noncohesive; no odor. | GW | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106125

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/27/2011
Date TD Reached: 7/6/2011
Date Completed: 7/10/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472871.83
X Coordinate: 1542444.61

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); brown (7.5YR 5/3); dry; dense; 100% fine to very coarse sand; subangular to subrounded; trace silt and sand; noncohesive; no odor. | | | |
| 395 | | | | | Same as above (390 ft). | | | |
| | | SB0256 | 0.0 | | | SW | | Blow counts (397-398.5'): 50/60. |
| 400 | | | | | Same as above (390 ft); fine to coarse sand. | | | Kelly down @ 1054. New 20' connection @ 1122. |
| 405 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/4); dry; dense; 100% fine sand; trace coarse sand; subrounded; trace silt and clay; noncohesive; no odor. | SP | Bentonite Seal | |
| 410 | | | | | Well graded SAND (SW); brown (7.5YR 5/3); dry; dense; 100% fine to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SW | | |
| 415 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/4); dry; dense; 100% very fine sand; trace coarse sand; subrounded; trace silt and clay; noncohesive; no odor. | SP | | |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106125

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/27/2011
Date TD Reached: 7/6/2011
Date Completed: 7/10/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472871.83
X Coordinate: 1542444.61

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/4); dry; dense; 95% fine sand; 5% coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | | | Kelly down @ 1133. New 20' connection @ 1146. |
| 425 | | | | | Same as above (420 ft). | SP | Bentonite Seal | |
| 430 | | | | | Same as above (420 ft). | | | |
| 435 | | | | | Well graded SAND (SW); brown (7.5YR 5/2); dry; dense; 100% fine to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SW | Top of Filter Pack | |
| 440 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/4); dry; dense; 100% fine sand; subrounded; trace silt and clay; noncohesive. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1157. New 20' connection @ 1304 |
| 445 | | | | | Same as above (438 ft); very dense. | SP | | |
| | X | SB0257 | 0.0 | | | | | Blow counts (447-448.5'): 10/2. |
| 450 | X | SB0257 | | | | | | Blow counts (448.5-450'): 25/15. |

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# Borehole ID: KAFB-106125

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/27/2011
Date TD Reached: 7/6/2011
Date Completed: 7/10/2011

Ground Elevation AMSL (ft): 5345.6
Y Coordinate: 1472871.83
X Coordinate: 1542444.61

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | |
| | | | | | Well graded SAND (SW); light brownish gray (10YR 6/2); dry; dense; 100% fine to very coarse sand; subangular to subrounded; trace silt and clay. | SW | - Bottom of Screen | Kelly down @ 1314. New connection @ 1359. |
| 455 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/3); dry; dense; 97% fine sand; 3% coarse sand; subrounded; trace silt and clay; noncohesive, no odor. | SP | | |
| 460 | | | | | | | | Total Depth = 457 ft. Reached @ 1410 on 7/6/11. |
| | | | | | | | | Water added during drilling (gallons) = 0 |
| 465 | | | | | | | | Water added after drilling (gallons) = 0 |
| | | | | | | | | Water added during construction (gallons) = Not Recorded |
| 470 | | | | | | | | Spud: started drilling from surface. |
| | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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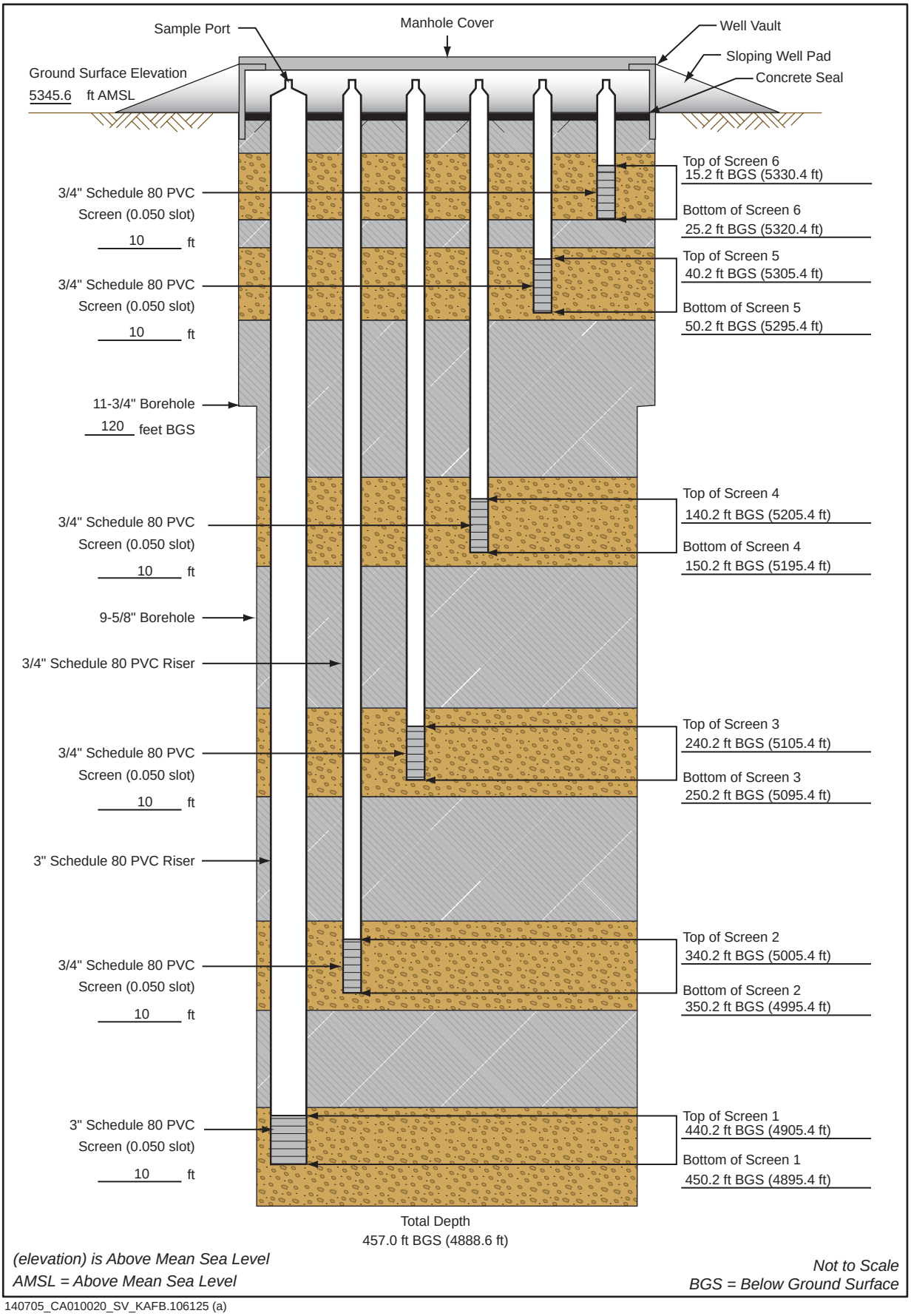
# Nested Soil Vapor Well Completion Diagram for KAFB-106125

Installation Start Date/Time: 7/16/2011 @ 15:00
Installation End Date/Time: 7/10/2011 @ 09:35



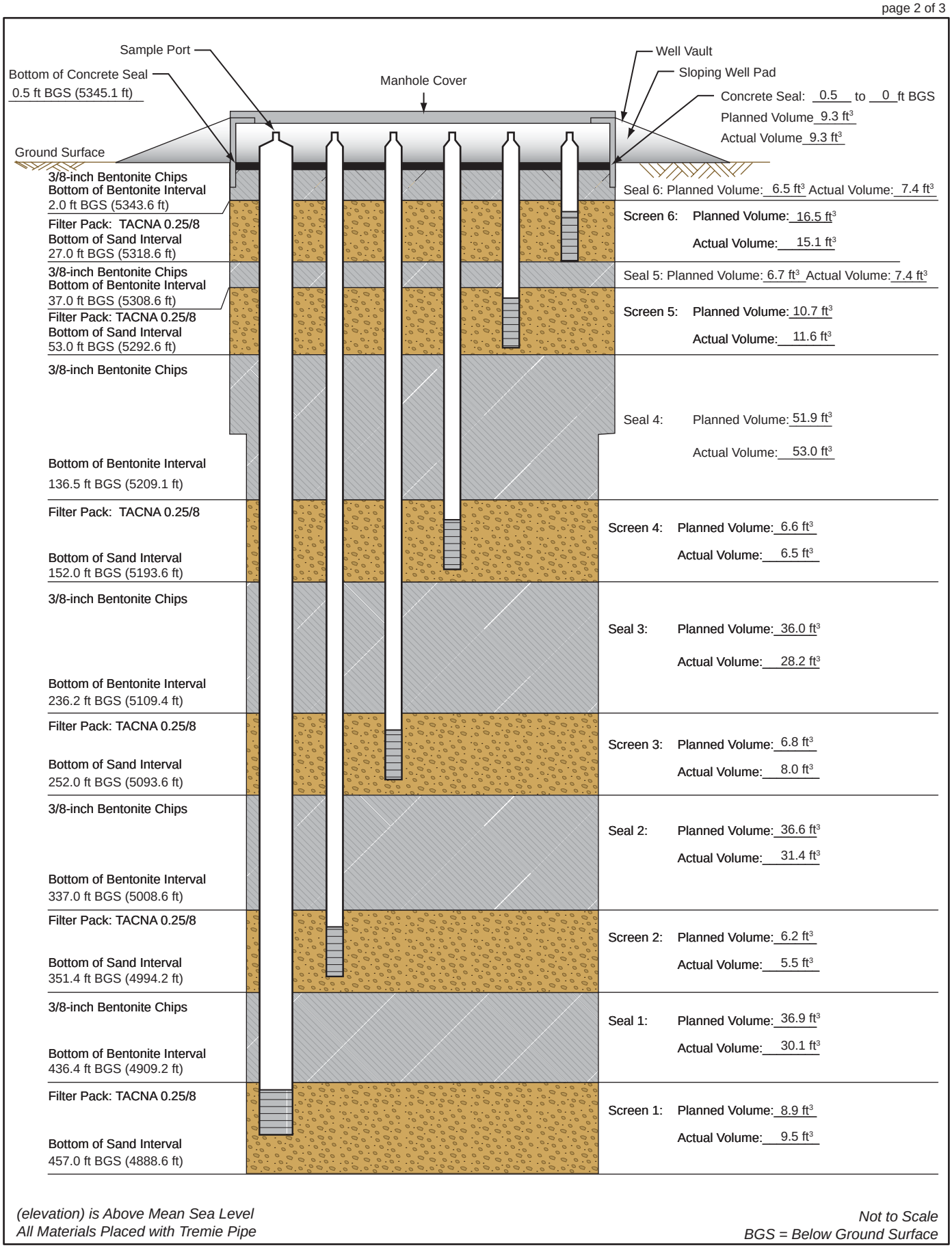



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106125






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

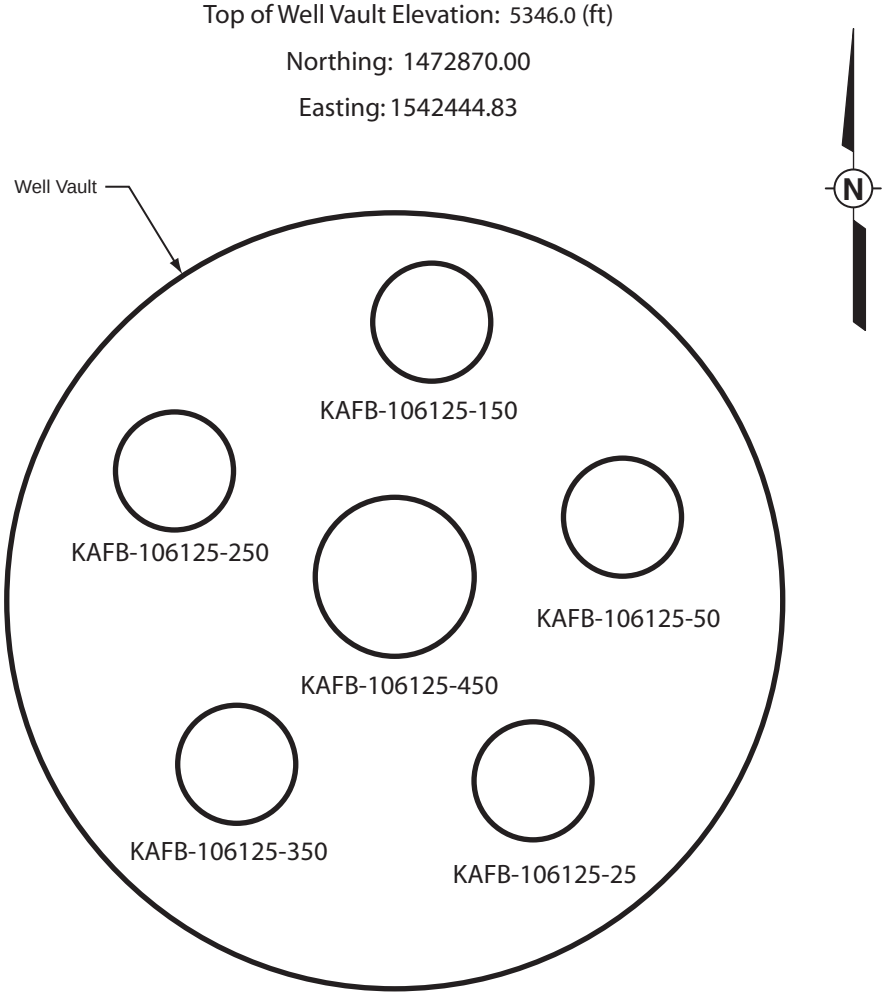
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106125



Top of Well Vault Elevation: 5346.0 (ft)

Northing: 1472870.00

Easting: 1542444.83




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106125-25 | 3/4 | 25.2 | 15.2 - 25.2 | 1472869.68 | 1542445.02 | 5345.5 |
| KAFB-106125-50 | 3/4 | 50.2 | 40.2 - 50.2 | 1472869.75 | 1542444.73 | 5345.5 |
| KAFB-106125-150 | 3/4 | 150.2 | 140.2 - 150.2 | 1472869.52 | 1542444.56 | 5345.5 |
| KAFB-106125-250 | 3/4 | 250.2 | 240.2 - 250.2 | 1472869.25 | 1542444.76 | 5345.5 |
| KAFB-106125-350 | 3/4 | 340.2 | 340.2 - 350.2 | 1472869.34 | 1542445.03 | 5345.5 |
| KAFB-106125-450 | 3 | 450.2 | 440.2 - 450.2 | 1472869.61 | 1542444.80 | 5345.5 |

# Borehole ID: KAFB-106126

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/10/2011
Date TD Reached: 7/12/2011
Date Completed: 7/14/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1472798.51
X Coordinate: 1542499.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | SILT (ML); light reddish brown (2.5YR 6/4); dry; very soft; nonplastic; 90% silt; 10% coarse sand; subangular; no odor. | ML | Concrete Seal | Hand augered. |
| 5 | | | | | Clayey SAND (SC); reddish gray (5YR 5/2); dry; very loose; 80% fine to very coarse sand; subangular to subrounded; 20% clay; noncohesive; no odor. | SC | Bentonite Seal | Spud @ 1300 on 7/10/11. |
| 10 | | SB0258 | 0.5 | | Same as above (5 ft); caliche. | | Top of Filter Pack | Kelly down @ 1305. New 10' connection @ 1331. Blow counts (10-11.5'): 11/12. |
| 15 | | | | | Same as above (5 ft). | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| | | | | | SILT (ML); yellowish red (5YR 4/6); dry; very soft; low plasticity; 83% silt; 15% clay; 2% coarse sand; subangular. | ML | | |
| 20 | | SB0259 | 0.0 | | Lean CLAY with Sand (CL); reddish brown (5YR 5/4); dry; very soft; low plasticity; 85% clay; 15% sand. | CL | | Kelly down @ 1340. New 10' connection @ 1400. Blow counts (20-21.5'): 22/30. |
| 25 | | | | | Well graded SAND (SW); reddish gray (5YR 5/2); dry; very loose; 95% fine to very coarse sand; subangular; 5% clay; noncohesive. | SW | Bottom of Screen | |
| | | | | | SILT (ML); reddish brown (5YR 5/3); dry; very soft; nonplastic; 80% silt; 10% clay; 10% coarse sand; subangular. | ML | Bentonite Seal | |
| 30 | | | | | | | | |

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# Borehole ID: KAFB-106126

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/10/2011
Date TD Reached: 7/12/2011
Date Completed: 7/14/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1472798.51
X Coordinate: 1542499.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | | | | |
| | | SB0260 SB0261 | 0.0 | | Lean CLAY (CL); reddish brown (5YR 5/4); dry; very soft; medium plasticity; 89% clay; 10% silt; 1% coarse sand; subangular; no odor. | CL | Bentonite Seal | Kelly down @ 1410. New 10' connection @ 1441. Blow counts (30-31.5'): 50/60. |
| 35 | | | | | SILT (ML); yellowish red (5YR 4/6); dry; very soft; low plasticity; 89% silt; 10% clay; 1% coarse sand; subangular; caliche; no odor. | ML | Top of Filter Pack | |
| 40 | | | | | | | | |
| | | SB0262 | 0.0 | | Same as above (35 ft). | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1448. New 10' connection @ 1508. Blow counts (40-41.5'): 50/65. |
| 45 | | | | | Same as above (35 ft). | | | |
| 50 | | | | | | | | |
| | | SB0263 | 0.0 | | SILT with Sand (ML); yellowish red (5YR 4/6); dry; very soft; low plasticity; 75% silt; 10% clay; 15% coarse sand; subangular; caliche; no odor. | | Bottom of Screen | Kelly down @ 1516. New 10' connection @ 1544. Blow counts (50-51.5'): 55/30. |
| 55 | | | | | Same as above (50 ft). | | Bentonite Seal | |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106126

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/10/2011
Date TD Reached: 7/12/2011
Date Completed: 7/14/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1472798.51
X Coordinate: 1542499.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); dry; very soft; nonplastic; 50% silt; 50% fine to very coarse sand; subangular; no odor. | ML | | Kelly down @ 1552. New 20' connection @ 1600. |
| 65 | | | | | Same as above (60 ft). | | | |
| | | | | | Well graded SAND (SW); 100% fine to very coarse sand; subangular. | SW | | |
| 70 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); dry; very soft; nonplastic; 50% silt; 50% fine to very coarse sand; subangular; no odor. | | | |
| 75 | | | | | Same as above (68 ft). | | Bentonite Seal | |
| 80 | | | | | SILT (ML); yellowish red (5YR 5/6); dry; very soft; low plasticity; 78% silt; 20% clay; 2% coarse sand; trace gravel; subangular. Note: gravel is composed of quartz. | ML | | Kelly down @ 1606. New 20' connection @ 1616. |
| 85 | | | | | Same as above (80 ft). | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106126

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/10/2011
Date TD Reached: 7/12/2011
Date Completed: 7/14/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1472798.51
X Coordinate: 1542499.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); yellowish red (5YR 5/6); dry; very soft; low plasticity; 78% silt; 20% clay; 1% coarse sand; 1% gravel; subangular. Note: gravel is composed of quartz. | | | |
| 95 | | | | | Same as above (90 ft). | | | |
| 100 | | SB0264 | 0.0 | | Same as above (90 ft). | ML | | Kelly down @ 1626. New 20' connection @ 1654. Blow counts (100-101.5'): 35/42. |
| 105 | | | | | Same as above (90 ft). | | Bentonite Seal | |
| 110 | | | | | Poorly graded SAND (SP); pinkish gray (7.5YR 6/2); dry; very loose; 98% fine sand; 2% coarse sand; subangular to subrounded; trace silt and clay; noncohesive. | SP | | |
| 115 | | | | | Silty SAND (SM); brown (7.5YR 5/3); dry; very loose; 85% fine sand; subrounded; 15% silt and clay; noncohesive; no odor. | SM | | |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106126

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/10/2011
Date TD Reached: 7/12/2011
Date Completed: 7/14/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1472798.51
X Coordinate: 1542499.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Lean CLAY (CL); reddish brown (5YR 4/4); dry; very soft; low plasticity; 85% clay; 15% silt; trace coarse sand; subangular; no odor. | CL | | Kelly down @ 1659. End of 7/10/11. New 20' connection @ 1104 on 7/11/11. |
| 125 | | | | | Lean CLAY (CL); dark reddish brown (5YR 3/4); dry; very soft; medium plasticity; 100% clay; no odor. | | | |
| 130 | | | | | SILT (ML); brown (7.5YR 5/4); dry; very soft; nonplastic; 97% silt; 3% coarse sand; subangular; no odor. | | Bentonite Seal | |
| 135 | | | | | Same as above (128 ft); 80% silt; 10% clay; 10% coarse sand; subangular. | | Top of Filter Pack | |
| 140 | | | | | Same as above (128 ft); 80% silt; 10% clay; 10% coarse sand; subangular. | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1112. New 10' connection @ 1124. |
| 145 | | | | | Same as above (128 ft); 100% silt. | | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106126

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/10/2011
Date TD Reached: 7/12/2011
Date Completed: 7/14/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1472798.51
X Coordinate: 1542499.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | SB0265 | 0.0 | | SILT (ML); strong brown (7.5YR 5/6); dry; very soft; nonplastic; 99% silt; trace clay; 1% coarse sand; subangular; no odor. | | Bottom of Screen | Kelly down @ 1129. New 10' connection @ 1153. Blow counts (150-151.5'): 50/50. |
| 155 | | | | | Same as above (150 ft). | ML | | |
| 160 | | | | | Same as above (150 ft). | | | Kelly down @ 1200. New 20' connection @ 1359. |
| 165 | | | | | Well graded SAND (SW); brown (7.5YR 5/2); dry; very loose; 100% fine to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SW | Bentonite Seal | Approximate top of Santa Fe Group. |
| 170 | | | | | Poorly graded SAND (SP); pinkish gray (7.5YR 6/2); dry; very loose; 95% fine sand; 5% coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SP | | |
| 175 | | | | | Well graded SAND (SW); brown (7.5YR 5/2); dry; very loose; 100% fine to coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SW | | |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106126

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/10/2011
Date TD Reached: 7/12/2011
Date Completed: 7/14/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1472798.51
X Coordinate: 1542499.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND (SW); gray (7.5YR 6/1); dry; very loose; 100% fine to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SW | | Kelly down @ 1408. New 20' connection @ 1417. |
| 185 | | | | | Same as above (180 ft). | | | |
| | | | | | Silty SAND (SM). | SM | | |
| 190 | | | | | Well graded SAND (SW); gray (7.5YR 6/1); dry; very loose; 100% fine to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SW | Bentonite Seal | |
| 195 | | | | | Same as above (189 ft). | | | |
| 200 | | SB0266 | 0.0 | | Poorly graded SAND (SP); gray (7.5YR 6/1); dry; very loose; 95% fine sand; 5% coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SP | | Kelly down @ 1424. New 20' connection @ 1446. Blow counts (200-201.5'): 50/50. |
| 205 | | | | | Well graded SAND (SW); gray (7.5YR 5/1); dry; very loose; 100% fine to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SW | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106126

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/10/2011
Date TD Reached: 7/12/2011
Date Completed: 7/14/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1472798.51
X Coordinate: 1542499.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | SILT (ML); light brown (7.5YR 6/4); dry; very soft to soft; nonplastic; 99% silt; trace clay; 1% coarse sand; subangular; no odor. | | | |
| 215 | | | | | Same as above (210 ft). | ML | | |
| 220 | | | | | Well graded SAND (SW); gray (7.5YR 5/1); dry; very loose to loose; 100% fine to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | | Bentonite Seal | Kelly down @ 1456. New 20' connection @ 1503. |
| 225 | | | | | Same as above (220 ft). | SW | | |
| 230 | | | | | Poorly graded SAND (SP); pinkish gray (7.5YR 6/2); dry; very loose to loose; 95% fine sand; 5% coarse sand to gravel; subangular to subrounded; trace silt and clay; noncohesive; no odor. Note: gravel is composed of quartz. | | | |
| 235 | | | | | Same as above (230 ft). | SP | Top of Filter Pack | |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106126

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/10/2011
Date TD Reached: 7/12/2011
Date Completed: 7/14/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1472798.51
X Coordinate: 1542499.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND (SW); gray (7.5YR 6/1); dry; very loose to loose; 100% fine to coarse sand; subrounded; trace silt and clay; noncohesive; no odor. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1507. New 10' connection @ 1514. |
| 245 | | | | | Same as above (240 ft). | | | |
| 250 | | | | | Poorly graded SAND (SP); 95% fine sand; 5% coarse sand. | SP | Bottom of Screen | Kelly down @ 1517. New 10' connection @ 1545. Blow counts (250-251.5'): 50/50. |
| | X | SB0267 | 0.0 | | | | | |
| 255 | | | | | Well graded SAND (SW); gray (7.5YR 6/1); dry; very loose to loose; 100% fine to very coarse sand; trace silt and clay; noncohesive. Same as above (251 ft). | SW | | |
| 260 | | | | | Well graded GRAVEL (GW); brown (7.5YR 5/3); dry; very loose to loose; 100% fine to coarse gravel; trace silt and clay; noncohesive; no odor. Note: gravel is composed of quartz and sandstone. | GW | Bentonite Seal | Kelly down @ 1549. New 20' conneciton @ 1555. |
| 265 | | | | | SILT (ML); light brown (7.5YR 6/3); dry; very soft; nonplastic; 97% silt; 3% coarse sand; subangular. Same as above (260 ft). | ML | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106126

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/10/2011
Date TD Reached: 7/12/2011
Date Completed: 7/14/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1472798.51
X Coordinate: 1542499.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | SILT (ML); light brown (7.5YR 6/3); dry; very soft; nonplastic; 97% silt; 3% coarse sand; subangular; no odor. | | | |
| 275 | | | | | Same as above (270 ft); brown (7.5YR 5/4); low plasticity; 15% clay. | ML | | |
| 280 | | | | | Poorly graded SAND (SP); pinkish gray (7.5YR 6/2); dry; loose; 95% fine sand; 5% coarse sand; subangular; trace silt and clay; noncohesive; no odor. | SP | | Kelly down @ 1603. New 20' connection @ 1612. |
| 285 | | | | | Lean CLAY (CL); brown (7.5YR 4/3); dry; soft; medium plasticity; 94% clay; 5% silt; 1% coarse sand; subangular; no odor. | | Bentonite Seal | |
| 290 | | | | | Same as above (285 ft). | CL | | |
| 295 | | | | | Same as above (285 ft). | | | |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/4/11 11:58 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106126

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/10/2011
Date TD Reached: 7/12/2011
Date Completed: 7/14/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1472798.51
X Coordinate: 1542499.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | | | | |
| | | SB0268 | 0.0 | | Well graded GRAVEL (GW); pinkish gray (7.5YR 7/2); dry; loose; 100% fine to coarse gravel; subangular to subrounded; trace silt and clay; noncohesive; no odor. | | | Kelly down @ 1620. New 20' connection @ 1644. Blow counts (300-301.5'): 50/70. |
| 305 | | | | | Same as above (300 ft). | | | |
| 310 | | | | | Same as above (300 ft). | | | |
| 315 | | | | | Same as above (300 ft). | GW | Bentonite Seal | |
| 320 | | | | | Same as above (300 ft). | | | Kelly down @ 1650. New 20' connection @ 1659. |
| 325 | | | | | Same as above (300 ft). | | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106126

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/10/2011
Date TD Reached: 7/12/2011
Date Completed: 7/14/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1472798.51
X Coordinate: 1542499.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded GRAVEL (GW); gray (7.5YR 5/1); dry; loose; 100% fine to coarse gravel; subangular to subrounded; trace silt and clay; noncohesive; no odor. Note: gravel is composed of quartz. | | Bentonite Seal | |
| 335 | | | | | Same as above (330 ft). | GW | Top of Filter Pack | |
| 340 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/3); dry; loose; 95% fine sand; 5% coarse sand to gravel; subangular to subrounded; trace silt and clay; noncohesive. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1705. New 10' connection @ 1710. |
| 345 | | | | | Same as above (340 ft). | SP | | |
| 350 | | | | | Well graded SAND (SW); brown (7.5YR 5/3); dry; loose; 100% fine to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | | Bottom of Screen | Kelly down @ 1715. End of 7/11/11. New 10' connection @ 0908 on 7/12/11. Blow counts (350-351.5'): 50/60. Blow counts (351.5-353'): 60/50. |
| | | SB0269 | 0.0 | | | | | |
| | | SB1746 | 0.0 | | | | | |
| 355 | | | | | Same as above (350 ft). | SW | Bentonite Seal | |
| 360 | | | | | Poorly graded SAND (SP); brown | SP | | |

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# Borehole ID: KAFB-106126

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/10/2011
Date TD Reached: 7/12/2011
Date Completed: 7/14/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1472798.51
X Coordinate: 1542499.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | (7.5YR 4/3); dry; loose; 99% fine sand; 1% coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | | | Kelly down @ 0912. New 20' connection @ 0919. |
| 365 | | | | | Same as above (359 ft). | SP | | |
| 370 | | | | | Well graded GRAVEL (GW); brown (7.5YR 4/3); dry; loose; 100% fine to coarse gravel; subangular to subrounded; trace silt and clay; noncohesive; no odor. Note: gravel is composed of quartz and sandstone. | | | |
| 375 | | | | | Same as above (370 ft). | GW | Bentonite Seal | |
| 380 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/2); dry; loose; 95% fine sand; 5% coarse sand to gravel; subangular to subrounded; trace silt and clay; noncohesive; no odor. | | | Kelly down @ 0925. New 20' connection @ 0931. |
| 385 | | | | | Same as above (379 ft). | SP | | |
| | | | | | Well graded SAND (SW); 100% fine to very coarse sand. | SW | | |
| 390 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/2); dry; loose; 95% fine sand; 5% coarse sand to gravel; subangular to subrounded; trace silt and clay; | SP | | |

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# Borehole ID: KAFB-106126

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/10/2011
Date TD Reached: 7/12/2011
Date Completed: 7/14/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1472798.51
X Coordinate: 1542499.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | noncohesive; no odor. | | | |
| | | | | | Poorly graded SAND (SP); brown (7.5YR 4/2); dry; loose; 97% fine sand; 3% coarse to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | | | |
| 395 | | | | | Same as above (390 ft). | | | |
| 400 | | | | | | | | |
| | | SB0270 | 0.0 | | Poorly graded SAND (SP); brown (7.5YR 5/3); dry; loose; 50% fine sand; 50% medium to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | SP | | Kelly down @ 0936. New 20' connection @ 1007. Blow counts (400-401.5'): 45/50. |
| 405 | | | | | Same as above (400 ft). | | Bentonite Seal | |
| 410 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 95% fine sand; 5% coarse to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | | | |
| 415 | | | | | Same as above (410 ft). | | | |
| | | | | | Lean CLAY (CL); reddish brown (5YR 4/3); dry; soft; medium plasticity; 100% clay; trace coarse sand. | CL | | |
| 420 | | | | | Poorly graded SAND (SP); brown (10YR | SP | | |

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# Borehole ID: KAFB-106126

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/10/2011
Date TD Reached: 7/12/2011
Date Completed: 7/14/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1472798.51
X Coordinate: 1542499.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | 5/3); dry; medium dense; 97% fine sand; 3% coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | | | Kelly down @ 1016. New 20' connection @ 1024. |
| 425 | | | | | Same as above (419 ft); 100% very fine sand. | | | |
| 430 | | | | | Same as above (419 ft); 100% very fine sand. | SP | Bentonite Seal | |
| 435 | | | | | Same as above (419 ft); 100% very fine sand. | | Top of Filter Pack | |
| 440 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; medium dense; 100% fine to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1031. New 10' connection @ 1039. |
| 445 | | | | | Same as above (440 ft). | SW | | |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106126

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/10/2011
Date TD Reached: 7/12/2011
Date Completed: 7/14/2011

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1472798.51
X Coordinate: 1542499.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Diane Oshlo



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | |
| | | SB0271 | 0.0 | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); dry; medium dense; 97% fine sand; 3% coarse sand to gravel; subangular to subrounded; trace silt and clay; noncohesive; no odor. Note: gravel is composed of quartz. | SP | - Bottom of Screen | Kelly down @ 1043. New 10' connection @ 1111. Blow counts (450-451.5'): 40/55. |
| 455 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; medium dense; 50% fine sand; 50% medium to very coarse sand; subangular to subrounded; trace silt and clay; noncohesive; no odor. | | | |
| 460 | | | | | | | | Total depth = 458 ft. Reached @ 1116 on 7/12/11. |
| | | | | | | | | Water added during drilling (gallons) = 0 |
| 465 | | | | | | | | Water added after drilling (gallons) = 0 |
| | | | | | | | | Water added during construction (gallons) = Not recorded. |
| 470 | | | | | | | | Spud: started drilling from surface. |
| 475 | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 480 | | | | | | | | |

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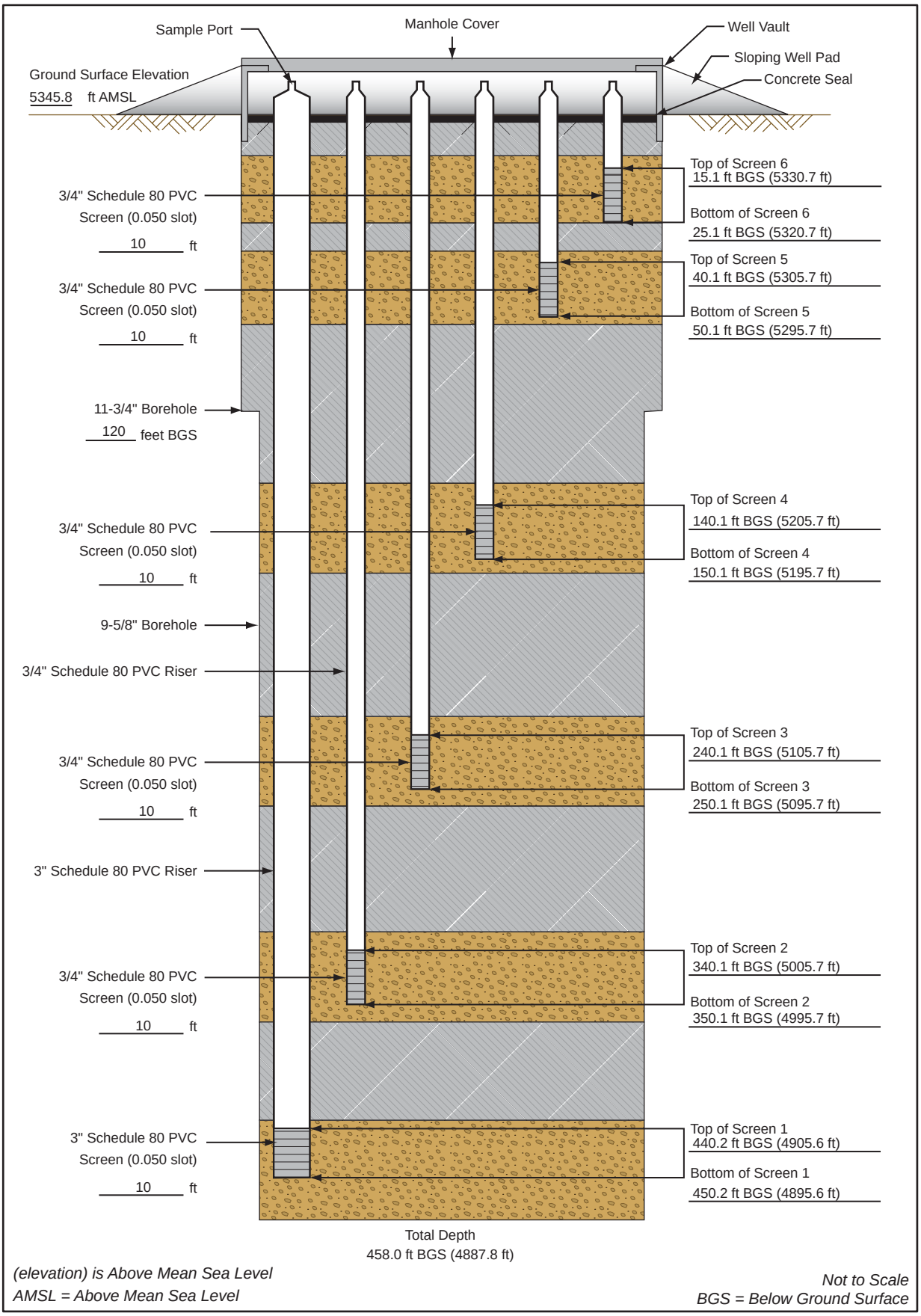
# Nested Soil Vapor Well Completion Diagram for KAFB-106126

Installation Start Date/Time: 7/12/2011 @ 14:30
Installation End Date/Time: 7/14/2011 @ 12:15



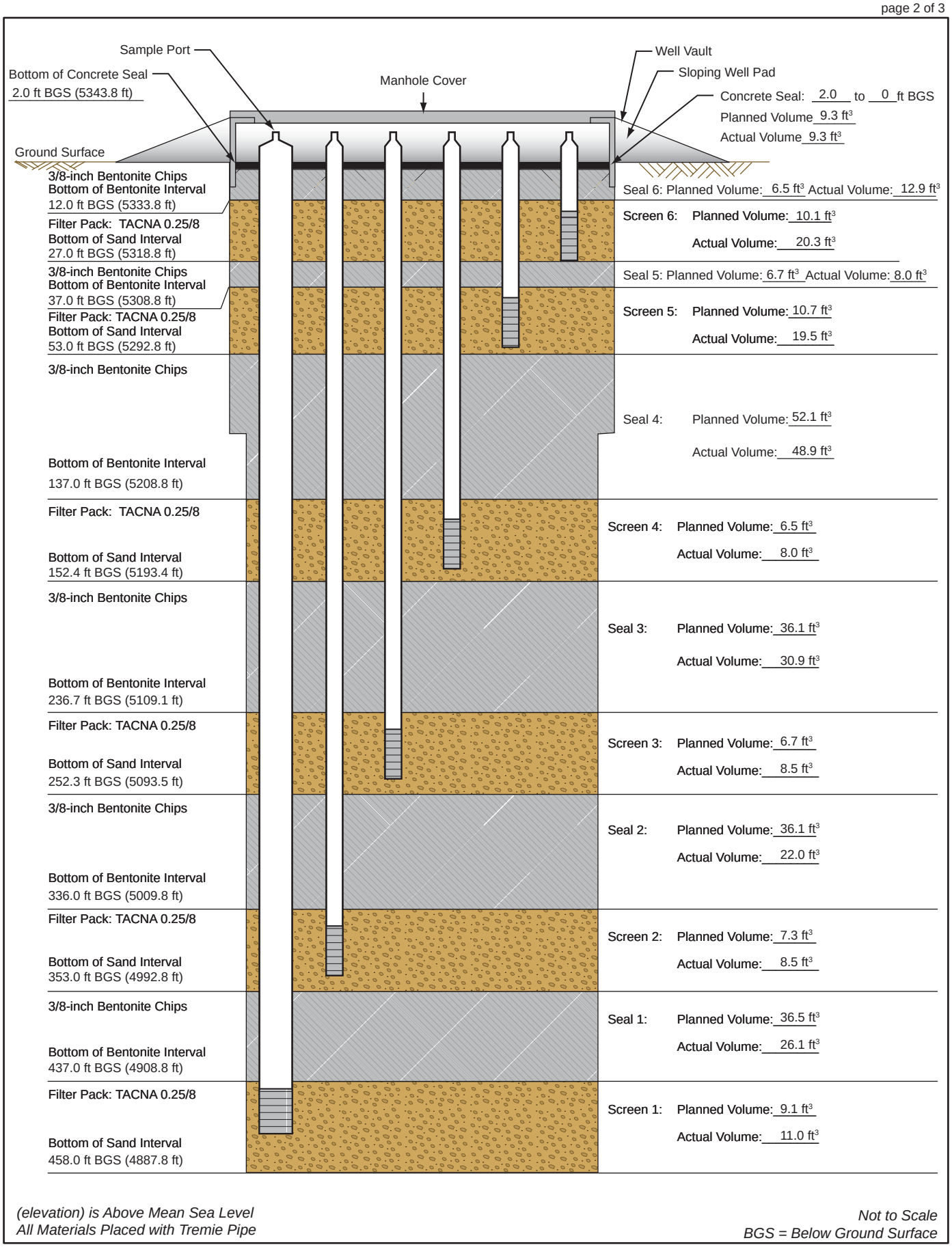



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106126






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

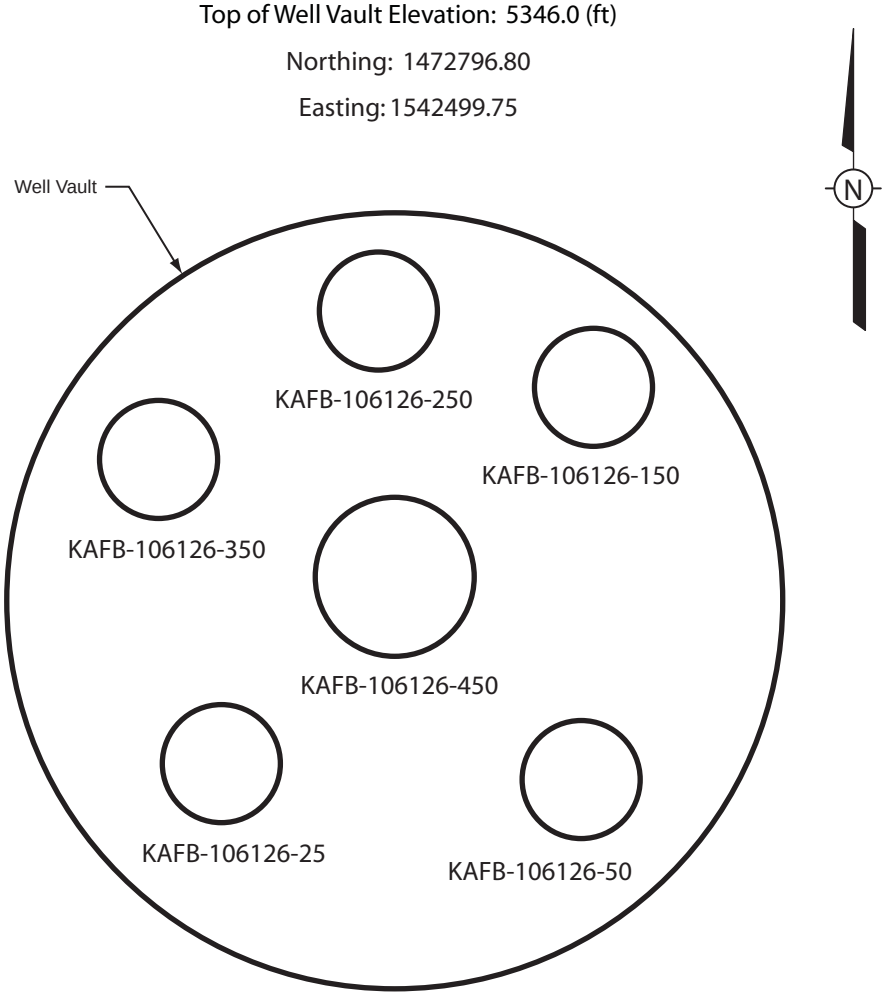
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106126



Top of Well Vault Elevation: 5346.0 (ft)

Northing: 1472796.80

Easting: 1542499.75




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106126-25 | 3/4 | 25.1 | 15.1 - 25.1 | 1472796.18 | 1542499.98 | 5345.6 |
| KAFB-106126-50 | 3/4 | 50.1 | 40.1 - 50.1 | 1472796.47 | 1542499.95 | 5345.5 |
| KAFB-106126-150 | 3/4 | 150.1 | 140.1 - 150.1 | 1472796.56 | 1542499.66 | 5345.5 |
| KAFB-106126-250 | 3/4 | 250.1 | 240.1 - 250.1 | 1472796.32 | 1542499.49 | 5345.5 |
| KAFB-106126-350 | 3/4 | 350.1 | 340.1 - 350.1 | 1472796.02 | 1542499.67 | 5345.6 |
| KAFB-106126-450 | 3 | 450.2 | 440.2 - 450.2 | 1472796.40 | 1542499.73 | 5345.6 |

# Borehole ID: KAFB-106127

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/20/2011
Date TD Reached: 7/23/2011
Date Completed: 7/26/2011

Ground Elevation AMSL (ft): 5345.9
Y Coordinate: 1472749.19
X Coordinate: 1542436.59

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Sandy SILT (ML); light brown (7.5YR 6/3); dry; soft; nonplastic; 60% silt; 40% fine to coarse sand; angular; no odor. | | Concrete Seal | Hand augered. |
| 5 | | | | | SILT (ML); light brown (7.5YR 6/4); damp; soft; nonplastic; 90% silt; 10% fine to coarse sand; subangular to subrounded; no odor. | | Bentonite Seal | Began drilling @ 0831 on 7/20/11. |
| | | SB0272 | 0.0 | | | | | Blow counts (7-8.5'): 10/25. |
| 10 | | | | | Same as above (5 ft); reddish yellow (7.5YR 6/6); 95% silt; 5% fine sand; angular; no odor. | | Top of Filter Pack | |
| 15 | | | | | Same as above (5 ft); brown (7.5YR 5/4); non to low plasticity; 100% silt; trace sand; trace fine gravel; caliche nodules; no odor. | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 0903. New 10' connection @ 0925. Resumed drilling @ 0926. |
| | | SB0273 | 0.0 | | | | | Blow counts (17-18.5'): 15/35. |
| 20 | | | | | Same as above (5 ft). | | | |
| 25 | | | | | SILT (ML); brown (7.5YR 5/4); damp; firm; low to medium plasticity; 100% silt; trace caliche nodules; no odor. | | Bottom of Screen | Kelly down @ 0933. New 10' connection @ 1011. Resumed drilling @ 1011. |
| | | SB0274 SB0274-MS | 0.0 | | | | Bentonite Seal | Blow counts (27-28.5'): 40/50. Blow counts (28.5-30'): 40/50. |
| 30 | | SB0274-MSD | 0.0 | | | | | |

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# Borehole ID: KAFB-106127

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/20/2011
Date TD Reached: 7/23/2011
Date Completed: 7/26/2011

Ground Elevation AMSL (ft): 5345.9
Y Coordinate: 1472749.19
X Coordinate: 1542436.59

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); brown (7.5YR 5/4); damp; soft; nonplastic; 100% silt; no odor. | | Bentonite Seal | |
| 35 | | | | | Same as above (30 ft); pink (7.5YR 7/3); trace sand; angular; caliche nodules. | | Top of Filter Pack | Kelly down @ 1017. New 10' connection @ 1053. Resumed drilling @ 1054. Blow counts (37-38.5'): 50/60. |
| | | SB0275 | 0.0 | | | | | |
| 40 | | | | | Same as above (30 ft); brown (7.5YR 5/3); dry; soft to firm; no odor. | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 45 | | | | | Same as above (30 ft); very firm. | | | Kelly down @ 1102. New 10' connection @ 1148. Resumed drilling @ 1148. Blow counts (47-48.5'): 60/50. Blow counts (48.5-50'): 50/50. |
| | | SB0276 | 0.0 | | | | | |
| 50 | | SB0277 | 0.0 | | Same as above (30 ft). | | Bottom of Screen | |
| 55 | | | | | Same as above (30 ft). | | Bentonite Seal | Kelly down @ 1159. New 20' connection @ 1318. Resumed drilling @ 1318. |
| 60 | | | | | Silty SAND (SM); brown (10YR 4/3); dry; dense; 80% fine to coarse sand; angular; 5% fine gravel; angular; 15% silt; no odor. Note: sand and gravel are | SM | | |

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**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

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Ground Elevation AMSL (ft): 5345.9
Y Coordinate: 1472749.19
X Coordinate: 1542436.59

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | composed of granite. | SM | | |
| 65 | | | | | SILT (ML); brown (7.5YR 5/4); damp; firm; nonplastic; 100% silt; no odor. | | | |
| 70 | | | | | Same as above (65 ft); low plasticity; trace fine gravel; rounded. | | | |
| 75 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); damp; firm; non to low plasticity; 60% silt; 40% fine to coarse sand; angular; no odor. Note: sand is composed of granite. | ML | Bentonite Seal | Kelly down @ 1331. New 20' connection @ 1340. Resumed drilling @ 1340. |
| 80 | | | | | SILT (ML); brown (7.5YR 5/4); dry; firm; non to low plasticity; 100% silt; no odor. | | | |
| 85 | | | | | Same as above (80 ft); trace fine gravel. | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106127

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/20/2011
Date TD Reached: 7/23/2011
Date Completed: 7/26/2011

Ground Elevation AMSL (ft): 5345.9
Y Coordinate: 1472749.19
X Coordinate: 1542436.59

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); brown (7.5YR 5/4); dry; firm; non to low plasticity; 95% silt; 5% fine to coarse sand; angular; no odor. | ML | | |
| 95 | | | | | Lean CLAY (CL); brown (7.5YR 5/3); damp; very firm; medium to high plasticity; 100% clay; no odor. | CL | | Kelly down @ 1355. New 20' connection @ 1435. Resumed drilling @ 1435. Blow counts (97-98.5'): 40/60. |
| | | SB0278 | 0.0 | | | | | |
| 100 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | SW | Bentonite Seal | Approximate top of Santa Fe Group. |
| 105 | | | | | Same as above (100 ft); trace fine gravel. | | | |
| 110 | | | | | SILT (ML); light yellowish brown (10YR 6/4); damp; firm; non to low plasticity; 100% silt; no odor. | ML | | |
| 115 | | | | | Same as above (110 ft). | | | Kelly down @ 1445. New connection @ 1454. Resumed drilling @ 1454. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106127

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/20/2011
Date TD Reached: 7/23/2011
Date Completed: 7/26/2011

Ground Elevation AMSL (ft): 5345.9
Y Coordinate: 1472749.19
X Coordinate: 1542436.59

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT (ML); light yellowish brown (10YR 6/4); damp; firm; non to low plasticity; 100% silt; no odor. | | | Kelly down @ 1458. Total depth with 11-3/4" casing. New connection @ 1715. End of 7/20/11. Resumed drilling with 9-5/8" casing @ 0824 on 7/21/11. |
| 125 | | | | | Same as above (120 ft). | | | |
| 130 | | | | | Same as above (120 ft). | ML | Bentonite Seal | |
| 135 | | | | | Same as above (120 ft); trace fine to coarse sand. | | Top of Filter Pack | Kelly down @ 0837. New 10' connection @ 0859. Resumed drilling @ 0859. |
| 140 | | | | | Silty SAND (SM); brown (10YR 5/3); dry; dense; 70% very fine to fine sand; 30% silt; no odor. | SM | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 145 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 95% fine to coarse sand; subrounded to rounded; 5% fine gravel; rounded; no odor. | SW | | Kelly down @ 0903. New 10' connection @ 0939. Resumed drilling @ 0939. Blow counts (147-148.5'): 50/60. |
| | | SB0279 | 0.0 | | | | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106127

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/20/2011
Date TD Reached: 7/23/2011
Date Completed: 7/26/2011

Ground Elevation AMSL (ft): 5345.9
Y Coordinate: 1472749.19
X Coordinate: 1542436.59

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | SILT (ML); brown (7.5YR 4/4); damp; firm; low to medium plasticity; 100% silt; no odor. | ML | Bottom of Screen | |
| 155 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; rounded; trace fine gravel to 1.5cm; subrounded; no odor. Note: sand is composed of volcanic tuff. | SW | | Kelly down @ 0944. New 20' connection @ 0955. Resumed drilling @ 0955. |
| 160 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; very dense; 75% fine gravel to 2cm; subrounded; 25% fine to coarse sand; no odor. Note: gravel is composed of basalt. | GP | | |
| 165 | | | | | Same as above (160 ft); 60% fine gravel; subrounded; 40% fine to coarse sand; no odor. | | Bentonite Seal | |
| 170 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subrounded to rounded; trace fine gravel; no odor. | SW | | |
| 175 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); dry; dense; 85% fine to coarse sand; rounded; 15% fine gravel to 2.5cm; subrounded; no odor. Note: sand is composed of volcanic tuff. | | | Kelly down @ 1000. New 20' connection @ 1008. Resumed drilling @ 1008. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106127

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/20/2011
Date TD Reached: 7/23/2011
Date Completed: 7/26/2011

Ground Elevation AMSL (ft): 5345.9
Y Coordinate: 1472749.19
X Coordinate: 1542436.59

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; rounded; no odor. | | | |
| 185 | | | | | Same as above (180 ft); trace coarse sand. | SP | | |
| 190 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% fine to coarse sand; subrounded; 10% gravel to 2cm; subrounded; no odor. Note: sand is composed of volcanic tuff. | | | |
| 195 | | | | | Same as above (190 ft). | | Bentonite Seal | Kelly down @ 1016. New 20' connection @ 1045. Resumed drilling @ 1045. Blow counts (197-198.5'): 50/50. |
| | | SB0280 | 0.0 | | | | | |
| 200 | | | | | Same as above (190 ft); 100% fine to coarse sand; subrounded. | SW | | |
| 205 | | | | | Same as above (190 ft); 90% fine to coarse sand; rounded; 5% fine gravel; subrounded; 5% clay nodules; no odor. | | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106127

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/20/2011
Date TD Reached: 7/23/2011
Date Completed: 7/26/2011

Ground Elevation AMSL (ft): 5345.9
Y Coordinate: 1472749.19
X Coordinate: 1542436.59

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; trace coarse sand; no odor. | | | |
| 215 | | | | | Same as above (210 ft); trace silt nodules. | SP | | Kelly down @ 1057. New 20' connection @ 1120. Resumed drilling @ 1121. |
| 220 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; trace fine gravel; no odor. | | Bentonite Seal | |
| 225 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 55% fine to coarse sand; subangular to subrounded; 45% fine gravel to 3cm; subrounded; no odor. Note: gravel is composed of basalt. | | | |
| 230 | | | | | Same as above (225 ft); 60% sand; 40% gravel. | SW | | |
| 235 | | | | | Same as above (225 ft); gravel to 2cm. | | Top of Filter Pack | Kelly down @ 1135. New 10' connection @ 1142. Resumed drilling @ 1142. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106127

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/20/2011
Date TD Reached: 7/23/2011
Date Completed: 7/26/2011

Ground Elevation AMSL (ft): 5345.9
Y Coordinate: 1472749.19
X Coordinate: 1542436.59

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/3); dry; dense; 80% fine to coarse sand; 20% fine gravel; subrounded; abundant tuff; no odor. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 245 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; very dense; 80% fine gravel to 3cm; subrounded to rounded; 20% fine to coarse sand; no odor. Note: gravel is composed of basalt. | GP | | Kelly down @ 1145. New 10' connection @ 1316. Resumed drilling @ 1316. Blow counts (247-248.5'): 50/70. |
| | | SB0281 | 0.0 | | | | | |
| 250 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 85% fine to coarse sand; subrounded; 15% fine gravel; subrounded; no odor. | SW | Bottom of Screen | |
| 255 | | | | | SILT (ML); light olive brown (2.5Y 5/3); damp; firm; low to medium plasticity; 100% silt; no odor. | ML | | Kelly down @ 1320. New 20' connection @ 1328. Resumed drilling @ 1328. |
| 260 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 100% very fine to fine sand; no odor. | SP | Bentonite Seal | |
| 265 | | | | | SILT (ML); brown (7.5YR 5/3); damp; firm; low plasticity; 100% silt; no odor. | ML | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106127

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/20/2011
Date TD Reached: 7/23/2011
Date Completed: 7/26/2011

Ground Elevation AMSL (ft): 5345.9
Y Coordinate: 1472749.19
X Coordinate: 1542436.59

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | SILT (ML); brown (7.5YR 5/3); damp; firm; low plasticity; 100% silt; no odor. | ML | | |
| 275 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 100% fine to coarse sand; subangular to subrounded; trace fine gravel; no odor. | SW | | Kelly down @ 1335. New 20' connection @ 1344. Resumed drilling @ 1347. |
| 280 | | | | | Same as above (275 ft). | SW | | |
| 285 | | | | | Same as above (275 ft); 95% sand; 5% clay nodules. | SW | Bentonite Seal | |
| 290 | | | | | Lean CLAY (CL); light olive brown (2.5Y 5/3); damp; firm; medium to high plasticity; 100% clay; no odor. | CL | | |
| 295 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); damp; dense; 80% fine to coarse sand; 15% gravel; 5% silt and clay; no odor. | SW | | Kelly down @ 1358. New 20' connection @ 1433. Resumed drilling @ 1433. Blow counts (297-298.5'): 35/60. |
| | | SB0282 | NR | | | | | |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106127

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/20/2011
Date TD Reached: 7/23/2011
Date Completed: 7/26/2011

Ground Elevation AMSL (ft): 5345.9
Y Coordinate: 1472749.19
X Coordinate: 1542436.59

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; rounded; 5% fine gravel; no odor. | | | |
| 305 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 55% fine to coarse sand; 45% fine gravel; subrounded; no odor. | | | |
| 310 | | | | | Same as above (305 ft); gravel to 3cm. | SW | | |
| 315 | | | | | Same as above (305 ft); 65% sand; 35% gravel. | | Bentonite Seal | Kelly down @ 1444. New 20' connection @ 1452. Resumed drilling @ 1452. |
| 320 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 80% fine gravel to 3.5cm; rounded; 20% fine to coarse sand; no odor. Note: gravel is composed of basalt. | | | |
| 325 | | | | | Same as above (320 ft); gravel to 1.5cm. | GP | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106127

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/20/2011
Date TD Reached: 7/23/2011
Date Completed: 7/26/2011

Ground Elevation AMSL (ft): 5345.9
Y Coordinate: 1472749.19
X Coordinate: 1542436.59

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 70% fine gravel to 1.5cm; subrounded; 30% fine to coarse sand; no odor. Note: gravel is composed of basalt. | GP | Bentonite Seal | |
| 335 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subangular; 5% fine gravel to 1cm; no odor. | SW | Top of Filter Pack | Kelly down @ 1502. New 10' connection @ 1511. Resumed drilling @ 1511. |
| 340 | | | | | Same as above (335 ft); 90% sand; 10% fine gravel to 3.5cm. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 345 | | | | | Same as above (335 ft); 100% fine to coarse sand. | | | Kelly down @ 1516. End of 7/21/11. New 10' connection @ 0810 on 7/23/11. Resumed drilling @ 0811. Geologist, R. Daly, began logging. Blow counts (347-348.5'): 60/70. |
| | X | SB0283 | 0.0 | | | | | |
| 350 | | | | | Same as above (335 ft); 100% fine to coarse sand; trace gravel to 2.5cm; no odor. | | Bottom of Screen | |
| 355 | | | | | Same as above (335 ft); 100% fine to coarse sand; trace gravel to 2.5cm; no odor. | | Bentonite Seal | Kelly down @ 0815. New 20' connection @ 0832. Resumed drilling @ 0833. |
| 360 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/4/11 15:40 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106127

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/20/2011
Date TD Reached: 7/23/2011
Date Completed: 7/26/2011

Ground Elevation AMSL (ft): 5345.9
Y Coordinate: 1472749.19
X Coordinate: 1542436.59

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); dry; loose; 85% very fine to very coarse sand; 15% gravel to 2cm; subrounded; no odor. | SW | | |
| 365 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; loose; 95% very fine to fine sand; 5% gravel to 3cm; subrounded; no odor. | SP | | |
| 370 | | | | | Same as above (365 ft); 100% fine sand. | | | |
| 375 | | | | | Well graded SAND with Gravel (SW); yellowish brown (10YR 5/6); moist; loose; 80% fine to coarse sand; 15% gravel to 1cm; subrounded; 5% silt; no odor. | SW | Bentonite Seal | Kelly down @ 0838. New 20' connection @ 0848. Resumed drilling @ 0849. |
| 380 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% very fine to very coarse sand; subrounded; no odor. | | | |
| 385 | | | | | Same as above (380 ft); trace gravel to 1cm. | | | |
| 390 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/4/11 15:40 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106127

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/20/2011
Date TD Reached: 7/23/2011
Date Completed: 7/26/2011

Ground Elevation AMSL (ft): 5345.9
Y Coordinate: 1472749.19
X Coordinate: 1542436.59

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); brown (10YR 5/3); loose; moist; 100% very fine to very coarse sand; subrounded; trace gravel to 1cm; no odor. | | | |
| 395 | | | | | Same as above (390 ft). | SW | | Kelly down @ 0852. New 20' connection @ 0923. Resumed drilling @ 0926. Blow counts (397-398.5'): 50/60. |
| | | SB0284 | 0.0 | | | | | |
| 400 | | | | | Well graded GRAVEL with Sand (GW); grayish brown (10YR 5/2); moist; loose; 60% gravel to 1.5cm; subrounded; 40% fine to coarse sand; no odor. | GW | | |
| 405 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% very fine to very coarse sand; subrounded; no odor. | SW | Bentonite Seal | |
| 410 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; loose; 95% very fine to fine sand; 5% silt; no odor. | SP | | |
| 415 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% fine to coarse sand; subrounded; no odor. | SW | | Kelly down @ 0931. New 20' connection @ 0943. Resumed drilling @ 0945. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106127

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/20/2011
Date TD Reached: 7/23/2011
Date Completed: 7/26/2011

Ground Elevation AMSL (ft): 5345.9
Y Coordinate: 1472749.19
X Coordinate: 1542436.59

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% fine to coarse sand; subrounded; no odor. | | | |
| 425 | | | | | Same as above (420 ft). | | | |
| 430 | | | | | Same as above (420 ft); grading coarser. | SW | Bentonite Seal | |
| 435 | | | | | Same as above (420 ft); grading coarser. | | Top of Filter Pack | Kelly down @ 0950. New 10' connection @ 1059. Resumed drilling @ 1102. |
| 440 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; loose; 95% very fine sand; trace gravel to 3cm; subrounded; 5% silt; no odor. | SP | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 445 | | | | | Well graded SAND (SW); brown (10YR 4/3); moist; loose; 100% very fine to very coarse sand; subrounded; no odor. | SW | | Kelly down @ 1107. New 10' connection @ 1131. Resumed drilling @ 1156. Blow counts (447-448.5'): 50/60. Blow counts (448.5-450'): Not |
| | | SB0285 | 0.2 | | | | | |
| 450 | | SB0285 | | | | | | |

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# Borehole ID: KAFB-106127

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 7/20/2011
Date TD Reached: 7/23/2011
Date Completed: 7/26/2011

Ground Elevation AMSL (ft): 5345.9
Y Coordinate: 1472749.19
X Coordinate: 1542436.59

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: Not Recorded
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock/Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% fine to very coarse sand; trace gravel to 1cm; subrounded; no odor. | SW | Bottom of Screen | recorded. |
| 455 | | | | | Same as above (450 ft). | | Filter Pack | |
| 460 | | | | | | | | Total depth = 458 ft. Reached @ 1208 on 7/23/11. |
| | | | | | | | | Water added during drilling (gallons) = 0 |
| 465 | | | | | | | | Water added after drilling (gallons) = 0 |
| | | | | | | | | Water added during construction (gallons) = Not recorded. |
| 470 | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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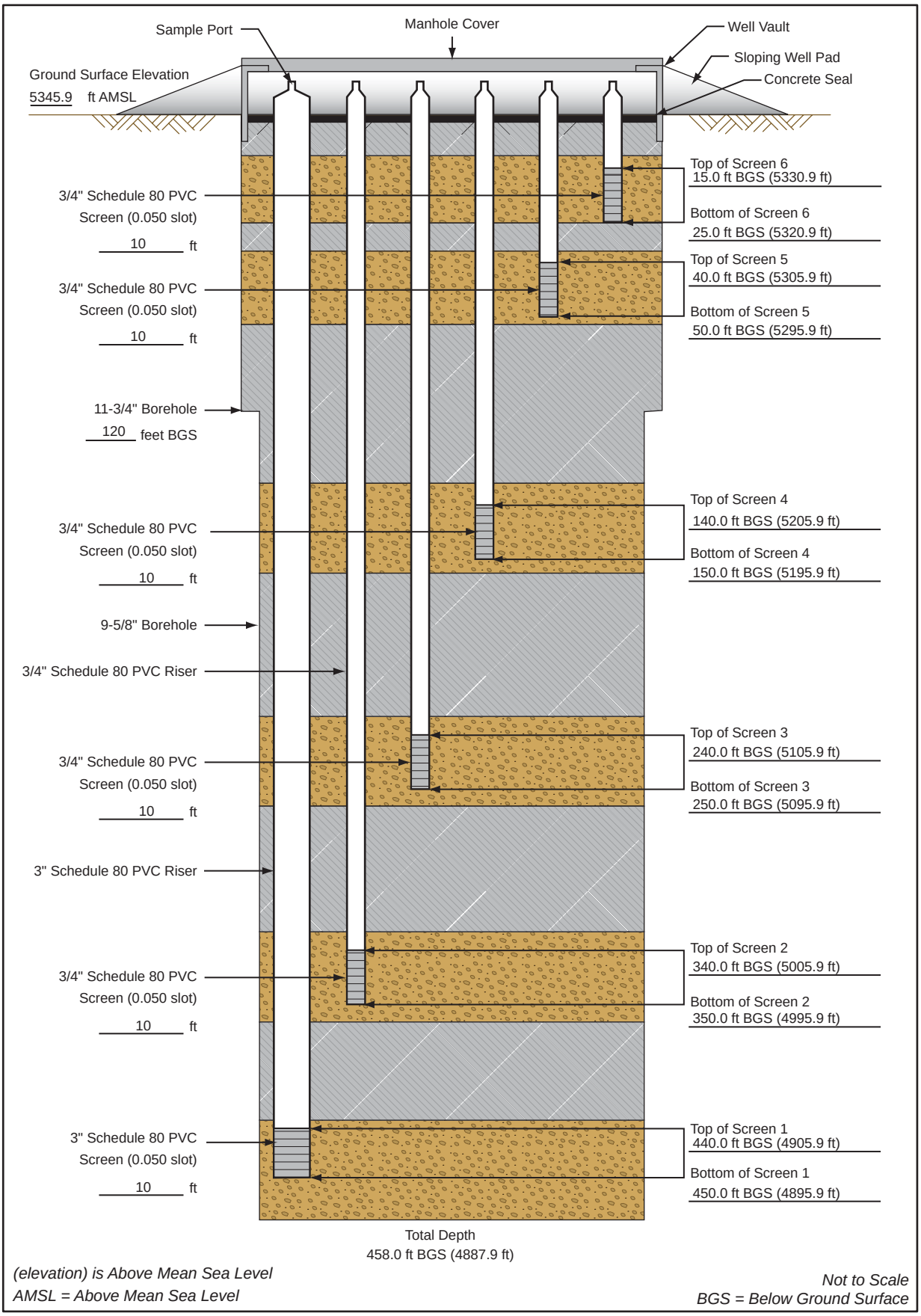
# Nested Soil Vapor Well Completion Diagram for KAFB-106127

Installation Start Date/Time: 7/23/2011 @ 12:00
Installation End Date/Time: 7/26/2011 @ 14:00



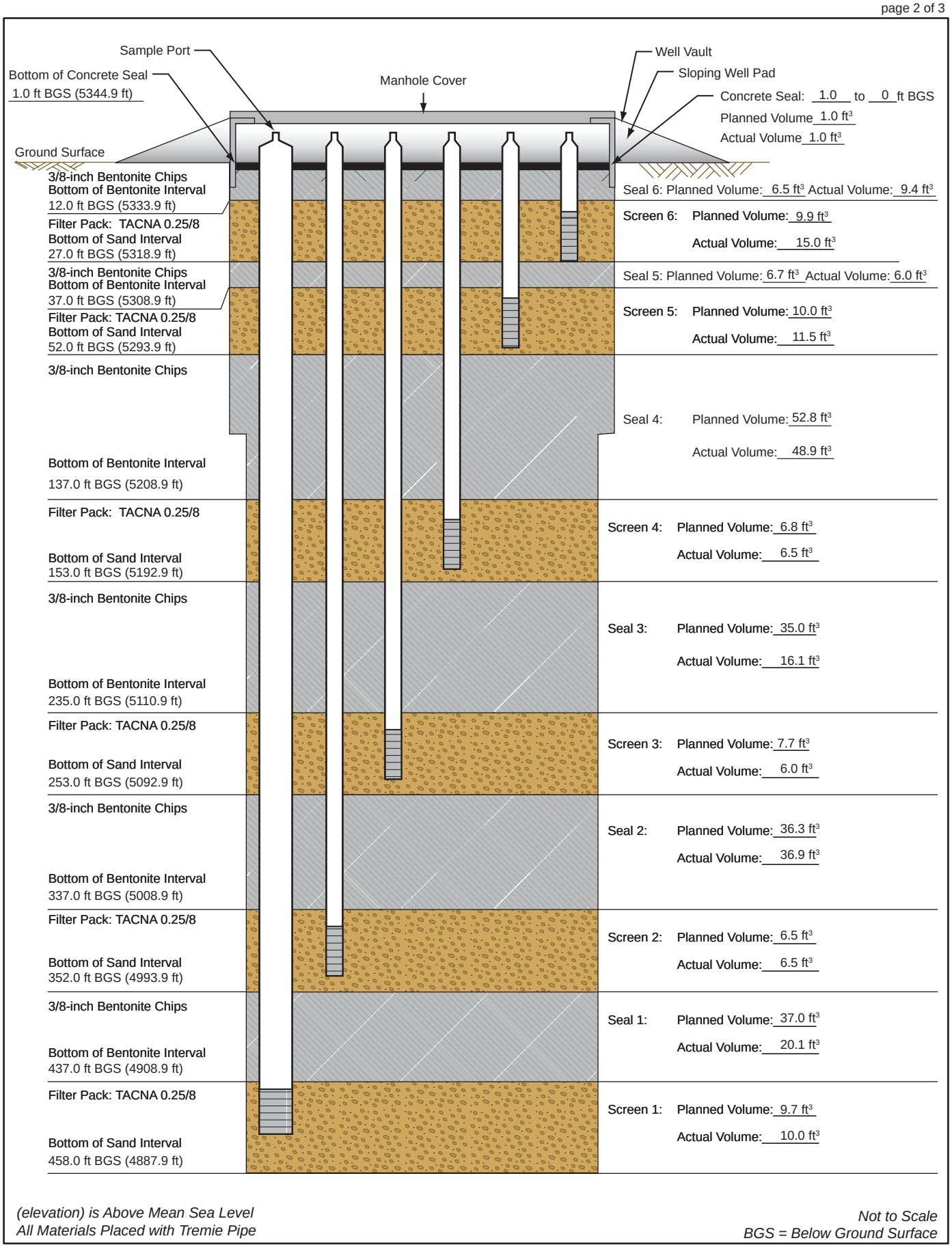



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106127






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

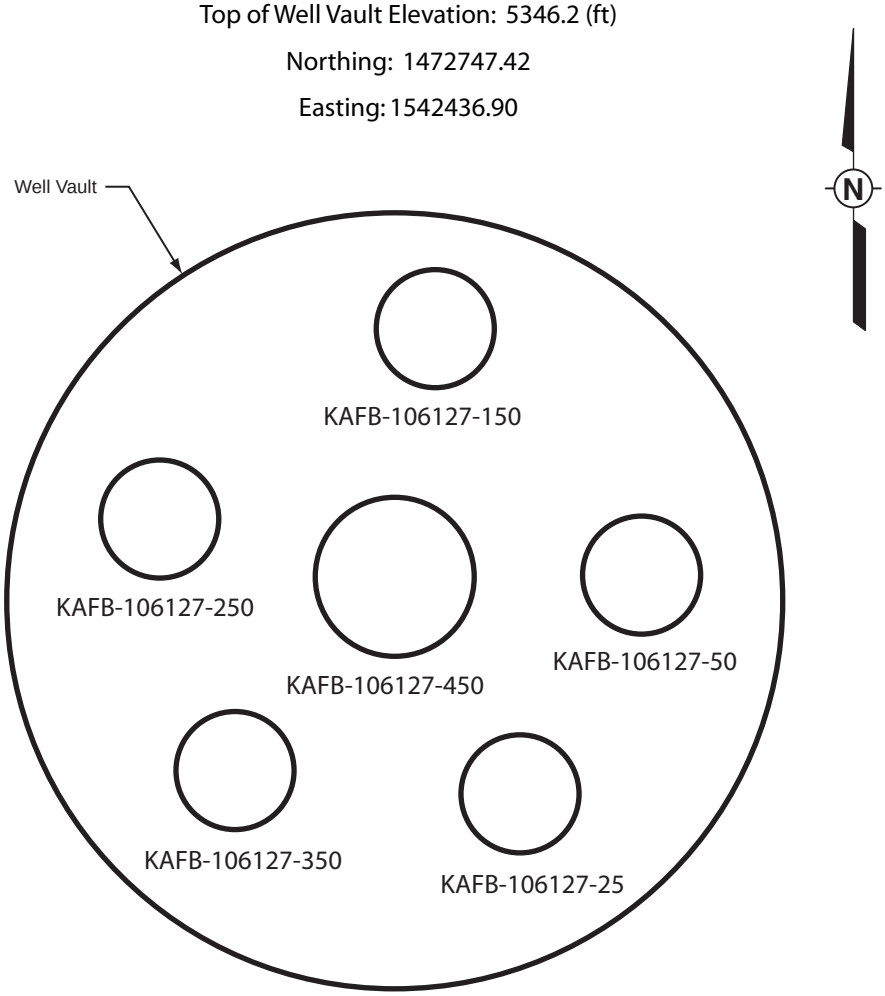
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106127



Top of Well Vault Elevation: 5346.2 (ft)

Northing: 1472747.42

Easting: 1542436.90




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106127-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1472747.07 | 1542437.03 | 5345.8 |
| KAFB-106127-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1472747.21 | 1542436.77 | 5345.8 |
| KAFB-106127-150 | 3/4 | 150.0 | 140.0 - 150.0 | 1472747.03 | 1542436.54 | 5345.8 |
| KAFB-106127-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1472746.71 | 1542436.69 | 5345.7 |
| KAFB-106127-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1472746.75 | 1542436.99 | 5345.7 |
| KAFB-106127-450 | 3 | 450.0 | 440.0 - 450.0 | 1472747.07 | 1542436.85 | 5345.8 |

# Borehole ID: KAFB-106128

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/5/2011
Date TD Reached: 3/6/2011
Date Completed: 3/8/2011

Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1473224.34
X Coordinate: 1541619.78

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Concrete. | | | |
| | | | | | No description recorded; disturbed. | | Concrete Seal | Hand augered. |
| 5 | | | | | | | | |
| | | | | | Silty SAND with Gravel (SM); light reddish brown (5YR 6/3); moist; loose; 60% very fine to medium sand; 15% gravel to 10mm; subangular to subrounded; 25% silt. | | | Began drilling @ 1150 on 3/5/11. |
| | | SB0286 | 0.0 | | | | | Blow counts (7-8.5'): 35/55/34. |
| | | | | | Silty SAND (SM); brown (7.5YR 4/4); moist; dense; 60% very fine to fine sand; 40% silt. | | Bentonite Seal | |
| 10 | | | | | | | | |
| 15 | | | | | | | | |
| | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; medium dense; 50% very fine to medium sand; 5% gravel to 13mm; subangular to subrounded; 35% silt; 10% clay; nonplastic. | SM | Top of Filter Pack<br>Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| | | SB0287<br>SB0287-MS | 0.0 | | | | | Blow counts (17-18.5'): 15/50/50. Blow counts (18.5-20'): 50/35/25. |
| | | SB0287-MSD | 0.0 | | Silty SAND (SM); red (2.5YR 4/6); moist; very dense; 70% very fine to medium sand; 30% silt. | | | |
| 20 | | | | | | | | New 10' connection @ 1225. Resumed drilling @ 1230. |
| 25 | | | | | | | | |
| | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; medium dense; 50% very fine to fine sand; 10% gravel to 10mm; subrounded to rounded; 40% silt. | | Bottom of Screen | |
| | | SB0288 | 0.0 | | Silty SAND (SM); reddish brown (5YR 4/4); moist; medium dense; 60% very fine to fine sand; 40% silt. | | Bentonite Seal | Blow counts (27-28.5'): 12/19/20. |
| 30 | | | | | | | | |

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# Borehole ID: KAFB-106128

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/5/2011
Date TD Reached: 3/6/2011
Date Completed: 3/8/2011

Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1473224.34
X Coordinate: 1541619.78

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Silty SAND (SM); reddish brown (5YR 4/4); moist; medium dense; 60% very fine to fine sand; 40% silt. | SM | Bentonite Seal | New 10' connection @ 1245. Resumed drilling @ 1250. |
| 35 | | | | | Same as above (30 ft); trace gravel to 13mm. | SM | | |
| | | SB0289 | 0.0 | | Silty SAND (SM); reddish brown (5YR 4/4); moist; dense; 55% very fine to fine sand; 45% silt. | SM | Top of Filter Pack | Blow counts (37-38.5'): 25/50/50. |
| 40 | | | | | Same as above (37 ft). | SM | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | New 10' connection @ 1300. Resumed drilling @ 1305. |
| 45 | | | | | Silty SAND (SM); reddish brown (5YR 5/4); moist; medium dense; 52% very fine to fine sand; 3% gravel to 15mm; subrounded to rounded; 35% silt; 10% clay. | SM | | |
| | | SB0290 SB0291 | 0.0 | | Well graded SAND with Gravel (SW); dry; very dense; 85% sand; 15% gravel to 8mm; angular to rounded. | SW | | Blow counts (47-48.5'): 44/66/80. |
| 50 | | | | | | SW | Bottom of Screen | New 10' connection @ 1320. Resumed drilling @ 1325. |
| 55 | | | | | Well graded SAND with Silt and Gravel (SW-SM); reddish brown (5YR 5/4); moist; loose; 70% sand; 20% gravel to 8mm; angular to subrounded; 10% silt. | SW-SM | Bentonite Seal | |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106128

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/5/2011
Date TD Reached: 3/6/2011
Date Completed: 3/8/2011

Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1473224.34
X Coordinate: 1541619.78

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | No cuttings returned. | | | New 20' connection @ 1330. Resumed drilling @ 1335. Drill bit stuck in front of casing. Water added to clear blockage. |
| 65 | | | | | Clayey SAND with Gravel (SC); reddish brown (5YR 4/4); moist; medium dense; 50% very fine to medium sand; 15% gravel; angular to rounded; 20% clay; 15% silt; nonplastic. | SC | | |
| 70 | | | | | Well graded SAND with Silt and Gravel (SW-SM); brown (7.5YR 5/4); moist; loose; 75% sand; 15% gravel to 12mm; subangular to rounded; 10% silt. | SW-SM | | |
| 75 | | | | | Silty SAND (SM); brown (7.5YR 5/4); moist; loose; 55% very fine to medium sand; 45% silt. | | Bentonite Seal | |
| 80 | | | | | Silty SAND (SM); reddish brown (2.5YR 4/4); moist; loose; 55% very fine to medium sand; 45% silt. | SM | | New 20' connection @ 1345. Resumed drilling @ 1350. |
| 85 | | | | | Silty SAND (SM); reddish brown (5YR 4/4); moist; loose; 60% fine to medium sand; trace coarse sand; 25% silt; 15% clay. | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106128

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/5/2011
Date TD Reached: 3/6/2011
Date Completed: 3/8/2011

Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1473224.34
X Coordinate: 1541619.78

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Silty SAND (SM); reddish brown (5YR 5/4); moist; loose; 55% very fine to medium sand; 20% silt; 20% clay; nonplastic. | SM | | |
| 95 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); moist; loose; 95% very fine to medium sand; 5% silt. | SP | | |
| | | SB0292 | 0.0 | | Poorly graded SAND (SP); reddish brown (5YR 5/4); moist; very loose; 95% very fine to medium sand; 5% silt. | | | Blow counts (97-98.5'): 4/6/10. |
| 100 | | | | | Same as above (97 ft). | | | New 20' connection @ 1400. Resumed drilling @ 1405. |
| 105 | | | | | No cuttings returned. | | Bentonite Seal | Cyclone hose blocked with sand. Water injected to remove blockage. |
| 110 | | | | | Silty SAND (SM); reddish brown (5YR 5/4); moist; loose; 70% very fine to medium sand; 10% gravel to 10mm; subangular to subrounded; 20% silt. | SM | | |
| 115 | | | | | Poorly graded SAND with Silt (SP-SM); brown (7.5YR 5/4); moist; loose; 90% fine to medium sand; 10% silt. | SP-SM | | |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106128

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/5/2011
Date TD Reached: 3/6/2011
Date Completed: 3/8/2011

Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1473224.34
X Coordinate: 1541619.78

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Silty SAND (SM); brown (7.5YR 4/4); moist; loose; 54% very fine to medium sand; 1% gravel to 20mm; angular to subrounded; 45% silt. | SM | | |
| 125 | | | | | No cuttings returned. | | | |
| 130 | | | | | No cuttings returned. | | Bentonite Seal | |
| 135 | | | | | Clayey SAND (SC); reddish brown (5YR 4/4); moist; medium dense; 54% very fine to fine sand; 1% gravel to 15mm; angular to subangular; 45% clay; low plasticity. | SC | | |
| 140 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/3); moist; loose; 99% fine to very coarse sand; 1% gravel to 20mm; subangular to subrounded. | SP | Top of Filter Pack<br>Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | New 10' connection @ 1700. End of 3/5/11. Resumed drilling @ 0750 on 3/6/11. |
| 145 | | | | | Silty SAND (SM); yellowish red (5YR 5/6); moist; loose; 60% very fine to medium sand; 40% silt. | SM | | |
| | | SB0293 | 0.0 | | Silty SAND (SM); yellowish red (5YR 5/6); moist; very dense; 60% very fine to medium sand; 40% silt. | | | Blow counts (147-148.5'): 60/70. Blow counts (148.5-150'): 73/Not Recorded. |
| 150 | | SB0293 | | | | | | |

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# Borehole ID: KAFB-106128

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/5/2011
Date TD Reached: 3/6/2011
Date Completed: 3/8/2011

Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1473224.34
X Coordinate: 1541619.78

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Silty SAND (SM); yellowish red (5YR 5/6); moist; very dense; 60% very fine to medium sand; 40% silt. | SM | Bottom of Screen | New 10' connection @ 0825. Resumed drilling @ 0830. |
| 155 | | | | | Well graded SAND (SW); reddish brown (5YR 5/3); moist; loose; 90% sand; 10% gravel to 20mm; subrounded. | SW | | |
| 160 | | | | | Poorly graded GRAVEL with Sand (GP); reddish brown (5YR 5/4); moist; loose; 60% gravel to 15mm; subangular to subrounded; 40% medium to very coarse sand. | GP | | New 20' connection @ 0835. Resumed drilling @ 0840. |
| 165 | | | | | Poorly graded SAND with Gravel (SP); reddish brown (5YR 5/4); moist; loose; 60% medium to very coarse sand; 40% gravel to 25mm; subrounded to rounded. | | Bentonite Seal | |
| 170 | | | | | Poorly graded SAND with Gravel (SP); reddish brown (5YR 5/4); moist; loose; 70% medium to very coarse sand; 30% gravel to 5mm; subrounded to rounded. | SP | | |
| 175 | | | | | Poorly graded SAND (SP); light reddish brown (5YR 6/3); moist; loose; 100% fine to medium sand. | | | |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106128

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/5/2011
Date TD Reached: 3/6/2011
Date Completed: 3/8/2011

Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1473224.34
X Coordinate: 1541619.78

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Poorly graded SAND (SP); light reddish brown (5YR 6/3); moist; loose; 100% fine to medium sand. | SP | | New 20' connection @ 0845. Resumed drilling @ 0850. |
| 185 | | | | | Well graded SAND with Gravel (SW); brown (7.5YR 5/2); moist; loose; 80% sand; 20% gravel to 15mm; subrounded to rounded. | SW | | |
| 190 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); moist; loose; 90% fine to coarse sand; 10% gravel to 20mm; subrounded to rounded. | SP | | |
| 195 | | | | | Well graded SAND (SW); reddish brown (5YR 5/4); moist; loose; 90% sand; 10% gravel to 5mm; subrounded. | SW | Bentonite Seal | |
| | | SB0294 | 0.0 | | Poorly graded SAND (SP); reddish brown (5YR 5/4); moist; very dense; 95% very fine to medium sand; 5% gravel to 15mm; subangular to subrounded. | SP | | Blow counts (197-198.5'): 40/60. |
| 200 | | | | | | | | New 20' connection @ 0905. Resumed drilling @ 0910. |
| 205 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); moist; loose; 100% very fine to medium sand. | | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106128

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/5/2011
Date TD Reached: 3/6/2011
Date Completed: 3/8/2011

Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1473224.34
X Coordinate: 1541619.78

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND with Gravel (SW); reddish brown (5YR 5/4); moist; loose; 70% sand; 30% gravel to 10mm; subangular to rounded. | SW | | |
| 215 | | | | | Well graded SAND with Gravel (SW); reddish brown (5YR 5/4); moist; loose; 80% sand; 20% gravel to 25mm; subrounded to rounded. | | | |
| 220 | | | | | Well graded SAND with Gravel (SW); reddish brown (5YR 5/4); moist; loose; 70% sand; 30% gravel to 10mm; subangular to rounded. | | Bentonite Seal | New 20' connection @ 0920. Resumed drilling @ 0925. |
| 225 | | | | | Poorly graded GRAVEL with Sand (GP); moist; loose; 55% gravel to 20mm; subrounded to rounded; 45% fine to very coarse sand; abundant pumice as gravel and sand. | GP | | |
| 230 | | | | | Poorly graded SAND with Gravel (SP); light brown (7.5YR 6/4); moist; medium dense; 55% medium to very coarse sand; 45% gravel to 20mm; subangular to rounded. | SP | | |
| 235 | | | | | Same as above (230 ft). | | Top of Filter Pack | |
| 240 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/2/11 10:02 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106128

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/5/2011
Date TD Reached: 3/6/2011
Date Completed: 3/8/2011

Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1473224.34
X Coordinate: 1541619.78

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND with Gravel (SP); brown (7.5YR 5/4); moist; loose; 70% fine to coarse sand; 30% gravel to 30mm; subangular to subrounded. | SP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | New 10' connection @ 0930. Resumed drilling @ 0935. |
| | | | | | Silty SAND (SM); reddish brown (5YR 5/4); moist; loose; 55% fine to coarse sand; 10% gravel to 15mm; rounded; 35% silt. | SM | | |
| 245 | | | | | Poorly graded SAND (SP); moist; very dense; 100% fine to medium sand. | | | |
| | | SB0295 | 0.0 | | | | | Blow counts (247-248.5'): 70/Not Recorded. |
| 250 | | | | | Same as above (245 ft). | | Bottom of Screen | New 10' connection @ 0950. Resumed drilling @ 0955. |
| 255 | | | | | Same as above (245 ft). | SP | | |
| 260 | | | | | Poorly graded SAND with Gravel (SP); brown (7.5YR 5/3); moist; loose; 70% medium to very coarse sand; 30% gravel to 7mm; subangular to subrounded. | | Bentonite Seal | New 20' connection @ 1000. Resumed drilling @ 1005. |
| 265 | | | | | Well graded SAND with Gravel (SW); brown (7.5YR 5/3); moist; loose; 80% sand; 20% gravel to 15mm; subrounded to rounded. | SW | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106128

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/5/2011
Date TD Reached: 3/6/2011
Date Completed: 3/8/2011

Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1473224.34
X Coordinate: 1541619.78

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/3); moist; loose; 100% fine to medium sand; trace gravel to 15mm; subrounded. | SP | | |
| 275 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/3); moist; loose; 90% fine to medium sand; 10% gravel to 15mm; subrounded to rounded. | SP | | Very strong odor @ 1010. |
| 280 | | | | | Silty SAND (SM); reddish brown (5YR 4/3); moist; medium dense; 60% very fine to medium sand; 40% silt; very strong petroleum odor. | SM | | |
| 285 | | | | | Silty SAND (SM); reddish brown (5YR 4/3); moist; medium dense; 55% very fine to medium sand; 35% silt; 10% clay; very stong petroleum odor. | SM | Bentonite Seal | |
| 290 | | | | | Well graded SAND (SW); pinkish gray (5YR 6/2); moist; loose; 90% sand; 10% gravel to 10mm; subangular to rounded; petroleum odor. | SW | | |
| 295 | | | | | Poorly graded GRAVEL with Sand (GP); moist; loose; 60% gravel to 25mm; subangular to rounded; 40% fine to very coarse sand. | GP | | |
| | | SB0296 | 39.0 | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/6); moist; medium dense; 80% sand; 20% gravel to 20mm; subangular to rounded; strong petroleum odor and staining. | SW | | Blow counts (297-298.5'): 100/Not Recorded. Blow counts (298.5-300'): 100/Not Recorded. Blow |
| 300 | | SB1747 | 39.0 | | | | | |

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# Borehole ID: KAFB-106128

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/5/2011
Date TD Reached: 3/6/2011
Date Completed: 3/8/2011

Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1473224.34
X Coordinate: 1541619.78

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | | | | |
| | X | SB1747 | | | Poorly graded GRAVEL with Sand (GP); moist; medium dense; 80% gravel to 35mm; subangular to subrounded; 20% coarse to very coarse sand; light petroleum odor. | GP | | counts (300-301.5'): Not Recorded. |
| 305 | | | | | | | | |
| | | | | | Well graded SAND wih Gravel (SW); brown (7.5YR 5/3); moist; medium dense; 80% sand; 20% gravel to 20mm; subangular to rounded; light petroleum odor. | SW | | |
| 310 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); light reddish brown (5YR 6/3); moist; medium dense; 95% fine to medium sand; 5% gravel to 30mm; subrounded to rounded; light petroleum odor. | SP | | |
| 315 | | | | | | | Bentonite Seal | |
| | | | | | Well graded SAND with Gravel (SW); dry; medium dense; 70% sand; 30% gravel to 25mm; subangular to rounded; light petroleum odor. | | | |
| 320 | | | | | | | | |
| | | | | | Well graded SAND (SW); pinkish gray (7.5YR 7/2); moist; medium dense; 90% sand; 10% gravel to 15mm; subrounded to rounded; strong petroleum odor. | SW | | New 20' connection @ 1120. Resumed drilling @ 1125. |
| 325 | | | | | | | | |
| | | | | | Well graded SAND with Gravel (SW); pinkish gray (7.5YR 7/2); dry; medium dense; 80% sand; 20% gravel to 5mm; subangular to subrounded. | | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106128

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/5/2011
Date TD Reached: 3/6/2011
Date Completed: 3/8/2011

Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1473224.34
X Coordinate: 1541619.78

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/3); moist; medium dense; 70% sand; 30% gravel to 10mm; subangular to subrounded; light petroleum odor. | | Bentonite Seal | |
| 335 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); dry; medium dense; 65% sand; 35% gravel to 20mm; subangular to subrounded; no odor or staining. | SW | Top of Filter Pack | |
| 340 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); dry; medium dense; 60% sand; 40% gravel to 25mm; subangular to rounded. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 345 | | | | | Poorly graded SAND (SP); light reddish brown (5YR 6/4); dry; loose; 100% fine to coarse sand. | SP | | |
| | | | | | Well graded SAND with Gravel (SW); dry; loose; 80% sand; 20% gravel to 20mm; angular to rounded. | SW | | Blow counts (347-348.5'): 17/32/41. Blow counts (348.5-350'): 17/32/41. Blow counts (350-351.5'): Not Recorded. |
| 350 | X | SB0297 | 2.5 | | | | | |
| | X | SB0297 | | | | | | |
| | X | SB0297 | | | Poorly graded GRAVEL with Sand (GP); moist; medium dense; 80% gravel to 30mm; subrounded to rounded; 20% sand. | GP | Bottom of Screen | |
| 355 | | | | | Poorly graded SAND with Gravel (SP); pinkish gray (7.5YR 6/2); dry; medium dense; 80% medium to very coarse sand; 20% gravel to 20mm; subangular to subrounded; light petroleum odor. | SP | Bentonite Seal | |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106128

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/5/2011
Date TD Reached: 3/6/2011
Date Completed: 3/8/2011

Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1473224.34
X Coordinate: 1541619.78

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND with Gravel (SW); moist; medium dense; 85% sand; 15% gravel to 15mm; angular to subrounded; petroleum odor. | | Sand | New 20' connection @ 1245. Resumed drilling @ 1250. |
| 365 | | | | | Well graded SAND with Gravel (SW); dry; medium dense; 70% sand; 30% gravel to 20mm; subangular to rounded. | | | |
| 370 | | | | | Well graded SAND with Gravel (SW); moist; medium dense; 80% sand; 20% gravel to 15mm; subangular to rounded. | | | |
| 375 | | | | | Well graded SAND with Gravel (SW); dry; medium dense; 85% sand; 15% gravel to 5mm; angular to subrounded. | SW | Bentonite Seal | |
| 380 | | | | | Well graded SAND (SW); dry; medium dense; 90% sand; 10% gravel to 10mm. | | | New 20' connection @ 1330. Resumed drilling @ 1335. |
| 385 | | | | | Well graded SAND with Gravel (SW); brown (7.5YR 4/4); dry; medium dense; 60% sand; 40% gravel to 10mm; angular to subangular. | | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106128

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/5/2011
Date TD Reached: 3/6/2011
Date Completed: 3/8/2011

Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1473224.34
X Coordinate: 1541619.78

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND with Gravel (SW); brown (7.5YR 4/4); dry; medium dense; 60% sand; 40% gravel to 10mm; angular to subangular. | SW | | |
| | | | | | Well graded SAND with Silt (SW-SM); reddish brown (5YR 4/4); moist; medium dense; 80% sand; 10% gravel to 20mm; angular to subangular; 5% silt; 5% clay. | SW-SM | | |
| 395 | | | | | | | | |
| | | SB0298 | 0.8 | | | | | Blow counts (397-398.5'): 6/70. |
| | | | | | Well graded SAND (SW); dry; medium dense; 95% sand; 5% gravel to 4mm; angular to rounded. | SW | | |
| 400 | | | | | | | | New 20' connection @ 1400. Resumed drilling @ 1405. |
| 405 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; medium dense; 100% fine to medium sand; dominantly fine sand. | SP | Bentonite Seal | |
| 410 | | | | | | | | |
| | | | | | Well graded SAND with Gravel (SW); brown (7.5YR 4/2); dry; medium dense; 70% sand; 30% gravel to 20mm; angular to rounded. | SW | | |
| 415 | | | | | Same as above (410 ft). | | | |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106128

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/5/2011
Date TD Reached: 3/6/2011
Date Completed: 3/8/2011

Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1473224.34
X Coordinate: 1541619.78

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/2); dry; medium dense; 100% very fine to medium sand. | SP | | |
| 425 | | | | | Well graded SAND with Gravel (SW); brown (7.5YR 5/2); moist; medium dense; 60% sand; 40% gravel to 15mm; angular to subrounded. | SW | Bentonite Seal | |
| 430 | | | | | Same as above (425 ft). | | | |
| 435 | | | | | Silty SAND (SM); light brown (7.5YR 6/3); moist; medium dense; 60% very fine to fine sand; 40% silt; no odor. | SM | Top of Filter Pack | |
| 440 | | | | | Same as above (435 ft); brown (7.5YR 5/4). Note: petroleum odor from cyclone air. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 445 | | | | | Same as above (435 ft). | | | |
| | | SB0299 | 85.5 | | Poorly graded SAND (SP); light brown (7.5YR 6/3); dry; very dense; 100% fine to medium sand. | SP | | Blow counts (447-448.5'): 100/Not Recorded. Blow counts (448.5-450'): 100/Not Recorded. Blow |
| 450 | | SB0299 | | | | | | |

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# Borehole ID: KAFB-106128

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/5/2011
Date TD Reached: 3/6/2011
Date Completed: 3/8/2011

Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1473224.34
X Coordinate: 1541619.78

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | |
| | | SB0299 | | | Poorly graded SAND with Silt (SP-SM); moist; dense; 90% very fine to fine sand; 10% silt. | SP-SM | Bottom of Screen | counts (450-451.5'): Not Recorded. New 10' connection @ 1510. Resumed drilling @ 1515. |
| 455 | | | | | Well graded SAND with Gravel (SW); moist; dense; 85% sand; 15% gravel to 10mm; subangular to rounded; petroleum odor. | SW | Native Backfill | |
| 460 | | | | | Clayey SAND (SC); brown (7.5YR 5/4); moist; medium dense; 55% very fine to fine sand; 45% clay. | SC | | Total depth = 457.9 ft. Reached @ 1530 on 3/6/11. |
| 465 | | | | | | | | Water added during drilling (gallons) = 0 |
| 470 | | | | | | | | Water added during construction (gallons) = Not Recorded |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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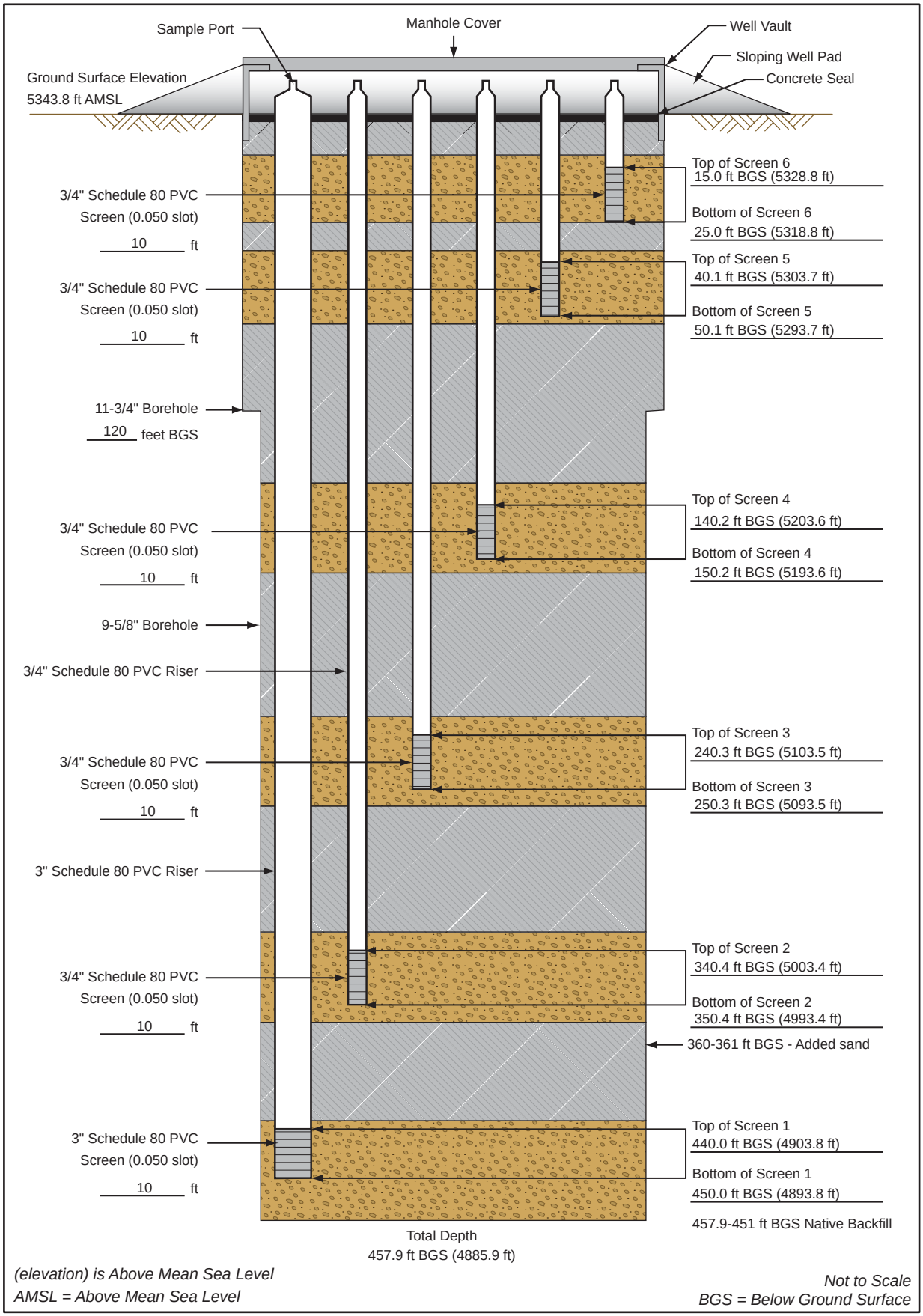
# Nested Soil Vapor Well Completion Diagram for KAFB-106128

Installation Start Date/Time: 3/7/2011 @ 11:40
Installation End Date/Time: 3/8/2011 @ 17:45



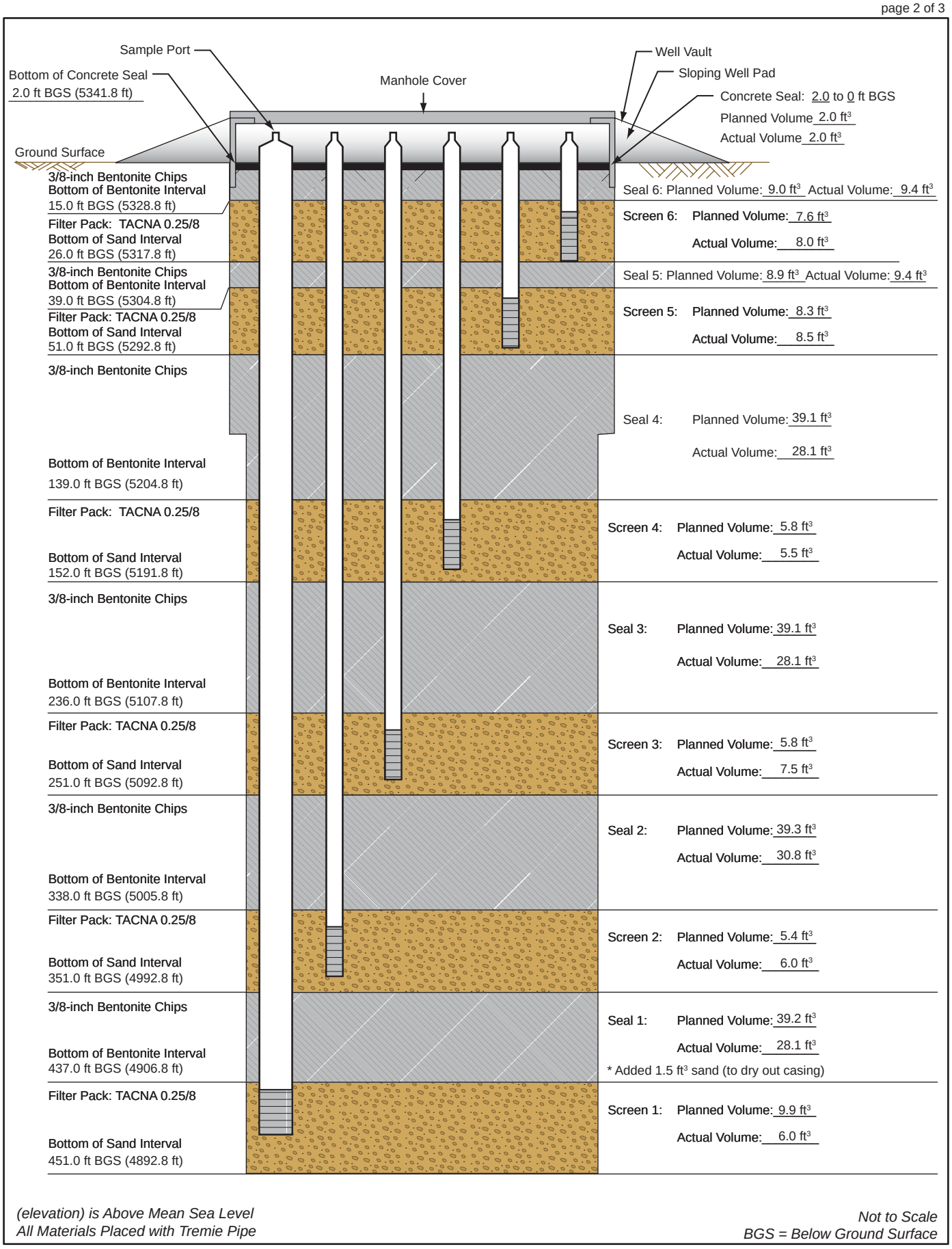



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106128






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

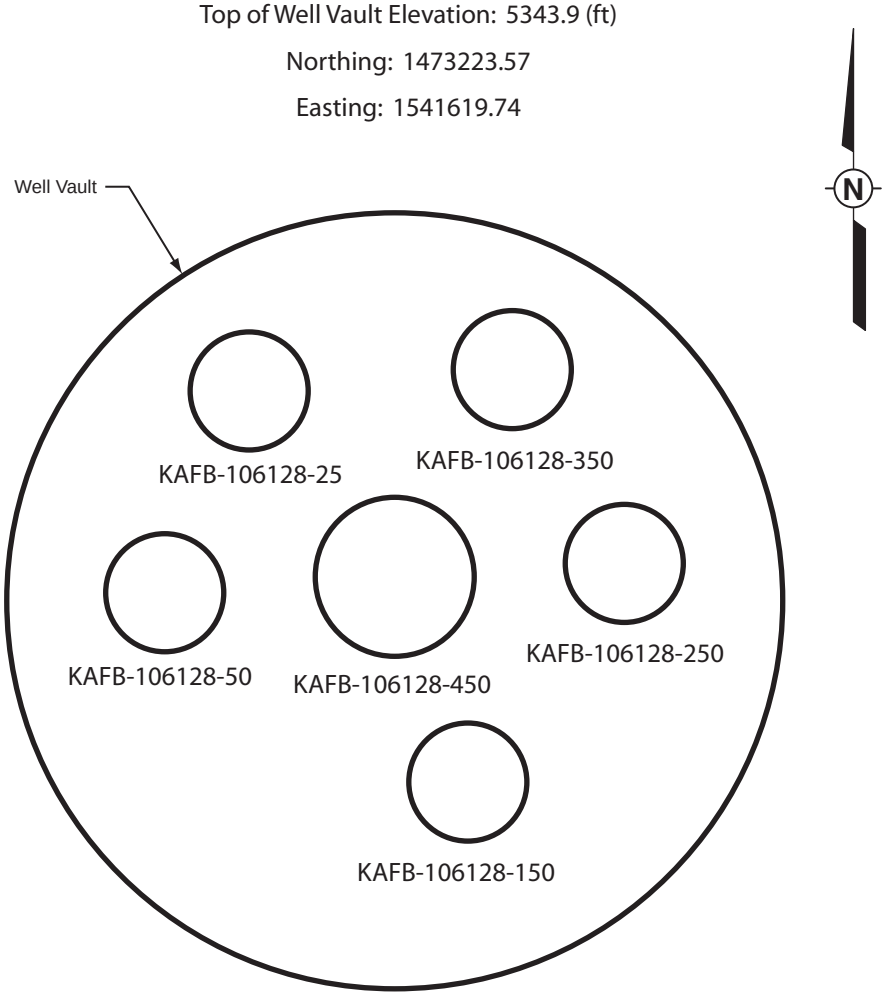
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106128



Top of Well Vault Elevation: 5343.9 (ft)

Northing: 1473223.57

Easting: 1541619.74




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106128-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1473223.25 | 1541619.61 | 5343.6 |
| KAFB-106128-50 | 3/4 | 50.1 | 40.1 - 50.1 | 1473222.98 | 1541619.50 | 5343.6 |
| KAFB-106128-150 | 3/4 | 150.2 | 140.2 - 150.2 | 1473222.78 | 1541619.72 | 5343.6 |
| KAFB-106128-250 | 3/4 | 250.3 | 240.3 - 250.3 | 1473222.92 | 1541619.98 | 5343.6 |
| KAFB-106128-350 | 3/4 | 350.4 | 340.4 - 350.4 | 1473223.25 | 1541619.92 | 5343.6 |
| KAFB-106128-450 | 3 | 450.0 | 440.0 - 450.0 | 1473223.15 | 1541619.72 | 5343.6 |

# Borehole ID: KAFB-106129

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/1/2011
Date TD Reached: 3/3/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5348.4
Y Coordinate: 1473262.72
X Coordinate: 1542130.45

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | No description recorded; disturbed. | | Concrete Seal | Hand augered. |
| 5 | | | | | Silty SAND (SM); light reddish brown (5YR 6/3); dry; loose; 60% very fine to fine sand; 10% fine gravel; 30% silt; trace clay. | SM | | Began drilling @ 1145 on 3/1/11. |
| | | SB0300 | 0.0 | | | | | Blow counts (7-8.5'): 9/11. |
| 10 | | | | | Same as above (5 ft). | | Bentonite Seal; Top of Filter Pack | Stopped drilling @ 1200. Resumed drilling @ 1315. |
| 15 | | | | | Silty SAND (SM); reddish brown (5YR 5/3); moist; loose; 60% very fine to fine sand; subrounded; trace fine gravel; 30% silt; 10% clay. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1329. Resumed drilling @ 1351. |
| | | SB0301 | 0.0 | | | | | Blow counts (18-19.5'): 11/16. |
| 20 | | | | | Clayey SAND (SC); reddish brown (5YR 5/3); moist; medium dense; 70% fine sand; subrounded; trace fine to coarse gravel; 30% clay; medium plasticity; trace carbonate. | SC | | |
| 25 | | | | | Same as above (20 ft). | | Bottom of Screen; Bentonite Seal | |
| | | SB0302 | 0.0 | | Poorly graded SAND with Silt (SP-SM); light reddish brown (5YR 6/3); dry; loose; 90% very fine to fine sand; trace gravel; | SP-SM | | Blow counts (28-29.5'): 11/22. Kelly down @ 1409. Resumed drilling |
| 30 | | | | | | | | |

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# Borehole ID: KAFB-106129

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/1/2011
Date TD Reached: 3/3/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5348.4
Y Coordinate: 1473262.72
X Coordinate: 1542130.45

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | 10% silt and clay. | | | @ 1420. |
| | | | | | Poorly graded SAND with Silt (SP-SM); light reddish brown (5YR 6/4); moist; medium dense; 90% very fine to fine sand; rounded to subrounded; 10% silt. | | Bentonite Seal | |
| 35 | | | | | Same as above (31 ft); trace clay; mica flakes. | SP-SM | | |
| | | SB0303 | 0.0 | | | | Top of Filter Pack | Blow counts (38-39.5'): 17/24. Kelly down @ 1435. Resumed drilling @ 1450. |
| 40 | | | | | Same as above (31 ft); dry; trace caliche. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| | | | | | Same as above (31 ft); 5% coarse sand. | | | |
| 45 | | | | | Silty SAND (SM); yellowish red (5YR 5/6); dry; medium dense; 75% very fine to fine sand; subangular to subrounded; trace fine gravel; 20% silt; 5% clay. | | | |
| | | SB0304 | 0.0 | | | | | Blow counts (48-49.5'): 50/Not Recorded. Blow counts (49.5-51'): Not Recorded. Kelly down @ 1503. Resumed drilling @ 1526. |
| 50 | | SB0304 | | | Same as above (45 ft). | SM | Bottom of Screen | |
| 55 | | | | | Well graded GRAVEL with Silt (GW-GM); light brown (7.5YR 6/3); 80% fine to coarse gravel; angular to subangular; 10% fine sand; 10% silt. | GW-GM | Bentonite Seal | |
| 60 | | | | | Silty SAND (SM); yellowish red (5YR 5/6); dry; medium dense; 75% very fine to fine sand; subangular to subrounded; | SM | | |

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# Borehole ID: KAFB-106129

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/1/2011
Date TD Reached: 3/3/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5348.4
Y Coordinate: 1473262.72
X Coordinate: 1542130.45

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | trace fine gravel; 20% silt; 5% clay. | | | |
| | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/4); dry; loose; 100% very fine to fine sand; trace coarse sand; trace silt. | | | |
| 65 | | | | | Same as above (60 ft); 5% coarse sand; 5% fine gravel. | SP | | |
| 70 | | | | | Same as above (60 ft); reddish yellow (7.5YR 6/6). | | | |
| 75 | | | | | Well graded SAND with Gravel (SW); yellowish brown (10YR 5/4); dry; medium dense; 60% fine to coarse sand; 35% fine gravel; 5% fines. | SW | Bentonite Seal | |
| 80 | | | | | Poorly graded SAND (SP); light reddish brown (5YR 6/4); dry; loose; 85% fine sand; 15% medium to coarse sand; rounded to subrounded. | | | |
| 85 | | | | | Same as above (80 ft); trace gravel. | SP | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106129

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/1/2011
Date TD Reached: 3/3/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5348.4
Y Coordinate: 1473262.72
X Coordinate: 1542130.45

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Poorly graded SAND (SP); light reddish brown (5YR 6/4); dry; medium dense; 85% fine sand; 15% medium to coarse sand; rounded to subrounded; partially cemented. | | | |
| 95 | | | | | Same as above (90 ft); loose; trace fine gravel. | SP | | |
| | X | SB0305 | 0.0 | | | | | Blow counts (98-99.5'): 14/23. Kelly down @ 1620. End of 3/1/11. Resumed drilling @ 0856 on 3/2/11. |
| 100 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); dry; medium dense; 100% fine to medium sand; subangular to subrounded; primarily quartz. | | | |
| 105 | | | | | Well graded SAND with Gravel (SW); very pale brown (10YR 8/2); dry; medium dense; 85% fine to coarse sand; subangular to subrounded; 15% fine gravel; subangular. | | Bentonite Seal | |
| 110 | | | | | Same as above (105 ft); yellowish brown (10YR 5/4). | SW | | |
| 115 | | | | | Same as above (105 ft); light yellowish brown (10YR 6/4). | | | |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106129

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/1/2011
Date TD Reached: 3/3/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5348.4
Y Coordinate: 1473262.72
X Coordinate: 1542130.45

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | | | | |
| | | | | | Clayey SAND (SC); brown (7.5YR 5/4); slightly moist; medium dense; 85% very fine sand; trace coarse sand; 15% clay and silt; trace mica. | SC | | Started making 9-5/8" connection @ 1204. |
| 125 | | | | | | | | |
| | | | | | Poorly graded SAND with Clay (SP-SC); brown (7.5YR 5/4); slightly moist; loose; 90% very fine to fine sand; subrounded; 10% clay. | SP-SC | Bentonite Seal | |
| 130 | | | | | | | | |
| | | | | | Clayey SAND (SC); brown (7.5YR 5/4); slightly moist; medium dense; 85% very fine sand; trace coarse sand; 15% clay and silt; trace mica. | SC | | |
| 135 | | | | | | | | |
| | | | | | Sandy lean CLAY (CL); brown (7.5YR 5/4); moist; firm; low plasticity; 60% clay; 40% fine sand; subrounded. | CL | Top of Filter Pack | |
| 140 | | | | | | | | |
| | | | | | Same as above (135 ft); light brown (7.5YR 6/3); dry. | CL | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 145 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); very pale brown (10YR 7/4); dry; medium dense; 80% fine sand; 15% medium sand; 5% coarse sand; subrounded. | SP | | |
| | | SB0306 | 2.0 | | GRAVEL (GP); lense. | GP | | Blow counts (148-149.5'): 13/23. Kelly down @ 1420. Resumed drilling |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106129

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/1/2011
Date TD Reached: 3/3/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5348.4
Y Coordinate: 1473262.72
X Coordinate: 1542130.45

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Poorly graded SAND (SP); very pale brown (10YR 7/4); dry; medium dense; 80% fine sand; 15% medium sand; 5% coarse sand; subrounded. | SP | Bottom of Screen | @ 1434. |
| 155 | | | | | Clayey SAND (SC); brown (7.5YR 5/4); slightly moist; medium dense; 80% fine sand; subrounded; 20% clay. | SC | | |
| 160 | | | | | Poorly graded SAND (SP); light yellowish brown (10YR 6/4); slightly moist; loose; 100% fine to medium sand; trace coarse sand; subrounded; trace silt. | SP | | Kelly down @ 1440. Resumed drilling @ 1448. |
| 165 | | | | | Clayey SAND (SC); brown (7.5YR 5/4); slightly moist; medium dense; 80% fine sand; subrounded; 20% clay. | SC | Bentonite Seal | |
| 170 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); slightly moist; loose; 95% fine to medium sand; subrounded; 5% fine to coarse gravel to 20mm. | SP | | |
| 175 | | | | | Same as above (170 ft); finer sand. | | | |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106129

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/1/2011
Date TD Reached: 3/3/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5348.4
Y Coordinate: 1473262.72
X Coordinate: 1542130.45

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; loose; 100% fine to coarse sand; subrounded; trace coarse gravel. | | | Kelly down @ 1505. |
| 185 | | | | | Same as above (180 ft); more fine and medium sand. | SW | | |
| 190 | | | | | Same as above (180 ft). | | | |
| 195 | | | | | Well graded GRAVEL (GW); dark grayish brown; moist; loose; 95% fine to coarse gravel; subangular to subrounded; 5% medium to coarse sand. | GW | Bentonite Seal | |
| | | SB0307 | 1.5 | | | | | Blow counts (198-199.5'): 21/32. Blow counts (199.5-201'): 35/40. Kelly down @ 1525. Resumed drilling @ 1545. |
| 200 | | SB0308 | 1.5 | | Poorly graded SAND (SP); light gray (10YR 7/2); slightly moist; dense; 95% fine to medium sand; subangular to subrounded; 5% fine to coarse gravel. | | | |
| 205 | | | | | Same as above (200 ft). | SP | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106129

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/1/2011
Date TD Reached: 3/3/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5348.4
Y Coordinate: 1473262.72
X Coordinate: 1542130.45

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND with Gravel (SW). | SW | | |
| 215 | | | | | Poorly graded SAND (SP); light brownish gray (10YR 6/2); 95% medium to coarse sand; 5% coarse gravel. | SP | | |
| 220 | | | | | Well graded SAND with Gravel (SW); light brownish gray (10YR 6/2); slightly moist; loose; 60% fine to coarse sand; 40% fine to coarse gravel. | SW | Bentonite Seal | Kelly down @ 1600. Resumed drilling @ 1608. |
| 225 | | | | | Well graded SAND with Gravel (SW); light grayish brown (10YR 6/2); slightly moist; loose; 80% fine to coarse sand; 20% fine to coarse gravel. | | | |
| 230 | | | | | Same as above (225 ft). | | | |
| 235 | | | | | Poorly graded SAND (SP); light grayish brown (10YR 6/2); slightly moist; loose; 80% fine to medium sand; subrounded; 20% coarse sand; rounded; trace gravel to 50mm. | SP | Top of Filter Pack | |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106129

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/1/2011
Date TD Reached: 3/3/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5348.4
Y Coordinate: 1473262.72
X Coordinate: 1542130.45

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND (SP); light grayish brown (10YR 6/2); slightly moist; loose; 95% fine sand; subrounded; 5% coarse sand; rounded; trace gravel to 50mm. | SP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1620. Resumed drilling @ 1630. |
| 245 | | | | | Well graded SAND with Gravel (SW); grayish brown (10YR 5/2); 70% fine to medium sand; subangular; 30% coarse gravel to 60mm. | SW | | |
| 250 | | SB0309 | 0.7 | | | | | Blow counts (248.5-250'): 27/35. Kelly down @ 1635. |
| | | | | | Poorly graded SAND with Gravel (SW); grayish brown (10YR 5/2); 70% fine to medium sand; subangular; 30% coarse gravel to 60mm. | | Bottom of Screen | |
| 255 | | | | | Same as above (250 ft). | SP | | |
| 260 | | | | | Clayey SAND (SC); light brownish gray (10YR 6/2); dry; dense; 70% fine sand; 30% clay. | | Bentonite Seal | End of 3/2/11. Resumed drilling @ 0750 on 3/3/11. |
| 265 | | | | | Same as above (260 ft). | SC | | |
| 270 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/26/11 13:08 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106129

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/1/2011
Date TD Reached: 3/3/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5348.4
Y Coordinate: 1473262.72
X Coordinate: 1542130.45

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/2); slightly moist; medium dense; 95% fine sand; 5% medium sand; trace silt. | | | |
| 275 | | | | | Same as above (270 ft); yellowish brown (10YR 5/4); 70% fine sand; 30% medium sand. | SP | | |
| 280 | | | | | Same as above (270 ft). | | | |
| 285 | | | | | Sandy SILT (ML); brown (10YR 5/3); slightly moist; firm; 70% silt; 30% fine sand. | ML | Bentonite Seal | |
| 290 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); slightly moist; medium dense; 90% fine sand; 5% medium sand; 5% coarse sand; subangular to subrounded. | | | |
| 295 | | | | | Same as above (290 ft). | SP | | |
| | | SB0310 | 0.0 | | | | | Blow counts (297-298.5'): 18/27. Kelly down @ 0820. Resumed drilling @ 0843. |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106129

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/1/2011
Date TD Reached: 3/3/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5348.4
Y Coordinate: 1473262.72
X Coordinate: 1542130.45

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); slightly moist; medium dense; 90% fine sand; 5% medium sand; 5% coarse sand; subangular to subrounded. | | | |
| 305 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/6); slightly moist; medium dense; 70% fine sand; 10% medium sand; 10% coarse sand; subrounded; 10% fine gravel to 7mm; subangular. | | | |
| 310 | | | | | Same as above (305 ft); 5% gravel. | SP | | |
| 315 | | | | | Same as above (305 ft); 5% coarse gravel to 40mm. | | Bentonite Seal | |
| 320 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/6); slightly moist; medium dense; 50% fine sand; 20% medium sand; 20% coarse sand; 10% fine to coarse gravel to 30mm. | | | Kelly down @ 0847. |
| 325 | | | | | Same as above (320 ft). | SW | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/26/11 13:08 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106129

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/1/2011
Date TD Reached: 3/3/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5348.4
Y Coordinate: 1473262.72
X Coordinate: 1542130.45

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); slightly moist; medium dense; 35% coarse sand; 30% medium sand; 30% fine sand; subrounded; trace gravel. | | Bentonite Seal | |
| 335 | | | | | Same as above (330 ft); 5% gravel to 50mm. | SW | Top of Filter Pack<br>Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 340 | | | | | Same as above (330 ft); 40% coarse sand; 25% medium sand; 25% fine sand; rounded to subrounded; 10% gravel to 40mm. | | | Kelly down @ 0920. Resumed drilling @ 0928. |
| 345 | | | | | Poorly graded SAND (SP); dark grayish brown (10YR 4/2); slightly moist; medium dense; 50% medium sand; 40% fine sand; 10% coarse sand. | SP | Bottom of Screen | |
| | | SB0311 | 17.3 | | | | | Blow counts (347-348.5'): Not Recorded. |
| 350 | | | | | Silty SAND (SM); brown (7.5YR 5/3); slightly moist; medium dense; 80% fine sand; 20% silt. | SM | | Kelly down @ 0937. Resumed drilling @ 0956. |
| 355 | | | | | | | Bentonite Seal | |
| 360 | | | | | Well graded SAND (SW); brown (10YR 5/3); slightly moist; dense; 30% fine sand; 30% medium sand; 30% coarse sand; 10% gravel; subangular to subrounded. | SW | | |

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# Borehole ID: KAFB-106129

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/1/2011
Date TD Reached: 3/3/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5348.4
Y Coordinate: 1473262.72
X Coordinate: 1542130.45

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND (SW); brown (10YR 5/3); slightly moist; dense; 40% fine sand; 30% medium sand; 25% coarse sand; 5% gravel; subangular to subrounded. | | | Kelly down @ 1008. Resumed drilling @ 1015. |
| 365 | | | | | Same as above (360 ft); 30% fine sand; 30% medium sand; 30% coarse sand; 10% gravel. | SW | | |
| 370 | | | | | Same as above (360 ft); 30% fine sand; 30% medium sand; 30% coarse sand; 10% gravel. | | | |
| 375 | | | | | Clayey SAND (SC); dark brown (7.5YR 3/4); slightly moist; medium dense; 60% fine to medium sand; 10% coarse sand; 10% fine to coarse gravel; 20% clay; low plasticity. | SC | Bentonite Seal | |
| 380 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); slightly moist; dense; 30% fine sand; 30% medium sand; 30% coarse sand; 10% gravel; subangular to subrounded. | | | Kelly down @ 1025. Resumed drilling @ 1041. |
| 385 | | | | | Same as above (380 ft). | SW | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106129

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/1/2011
Date TD Reached: 3/3/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5348.4
Y Coordinate: 1473262.72
X Coordinate: 1542130.45

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); slightly moist; medium dense; 80% medium sand; 10% coarse sand; 10% fine sand. | SP | | |
| 395 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); slightly moist; medium dense; 100% fine to coarse sand. | SW | | Blow counts (397-398.5'): 21/29. Kelly down @ 1055. Resumed drilling @ 1115. |
| | | SB0312 | 1.7 | | | | | |
| 400 | | | | | Poorly graded SAND (SW); yellowish brown (10YR 5/4); slightly moist; medium dense; 45% fine sand; 45% medium sand; 10% coarse sand; subangular to subrounded. | | | |
| 405 | | | | | Same as above (400 ft); trace coarse sand. | SP | Bentonite Seal | |
| 410 | | | | | Same as above (400 ft). | | | |
| 415 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); slightly moist; medium dense; 100% fine to coarse sand. | SW | | |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106129

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/1/2011
Date TD Reached: 3/3/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5348.4
Y Coordinate: 1473262.72
X Coordinate: 1542130.45

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); slightly moist; medium dense; 100% fine to coarse sand; trace fine gravel. | SW | | Kelly down @ 1130. |
| 425 | | | | | Same as above (420 ft); 50% fine sand; 25% medium sand; 25% coarse sand; no gravel. | | Bentonite Seal | |
| 430 | | | | | Clayey SAND (SC); brown (10YR 5/3); moist; medium dense; 85% fine to coarse sand; subangular to subrounded; 15% clay. | SC | | Kelly down @ 1143. Resumed drilling @ 1248. |
| 435 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); moist; medium dense; 50% fine sand; 40% medium sand; 10% coarse sand. | SP | Top of Filter Pack | |
| 440 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; medium dense; 30% fine sand; 30% medium sand; 30% coarse sand; 10% fine gravel. | SW | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1255. Resumed drilling @ 1302. |
| 445 | X | SB0313 | 1.1 | | Poorly graded SAND (SP); brown (10YR 5/3); moist; medium dense; 80% fine sand; 10% medium sand; 10% coarse sand; trace fine to coarse gravel to 30mm. | SP | | Blow counts (447-448.5'): 17/24. |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106129

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/1/2011
Date TD Reached: 3/3/2011
Date Completed: 3/6/2011

Ground Elevation AMSL (ft): 5348.4
Y Coordinate: 1473262.72
X Coordinate: 1542130.45

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: William Werner



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; medium dense; 80% fine sand; 10% medium sand; 10% coarse sand; trace coarse gravel to 30mm. | SP | Bottom of Screen | |
| 455 | | | | | Lean CLAY with Sand (CL); grayish brown (10YR 5/2); moist; firm; 70% clay; 15% silt; 15% fine sand; trace coarse sand and gravel. | CL | | |
| | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; medium dense; 80% fine sand; 10% medium sand; 10% coarse sand; trace coarse gravel to 30mm; slight petroleum odor. | SP | Native Backfill | |
| 460 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; medium dense; 40% fine sand; 30% medium sand; 25% coarse sand; 5% fine to coarse gravel to 25mm. | SW | | Total depth = 460 ft. Reached @ 1348 on 3/3/11. |
| 465 | | | | | | | | Water added druing drilling (gallons) = 0 |
| | | | | | | | | Water added during construction (gallons) = Not Recorded |
| 470 | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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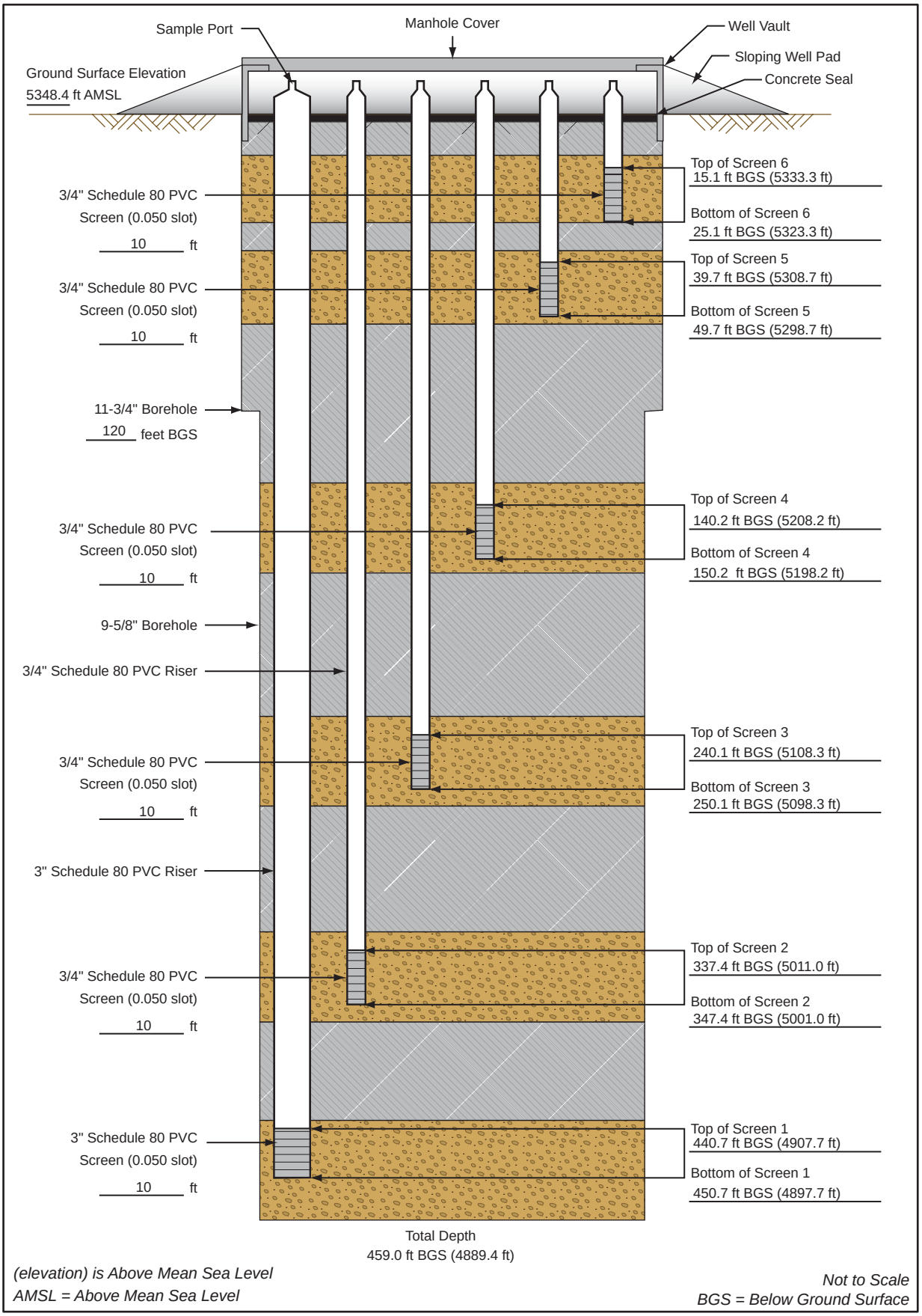
# Nested Soil Vapor Well Completion Diagram for KAFB-106129

Installation Start Date/Time: 3/3/2011 @ 16:40
Installation End Date/Time: 3/6/2011 @ 14:30



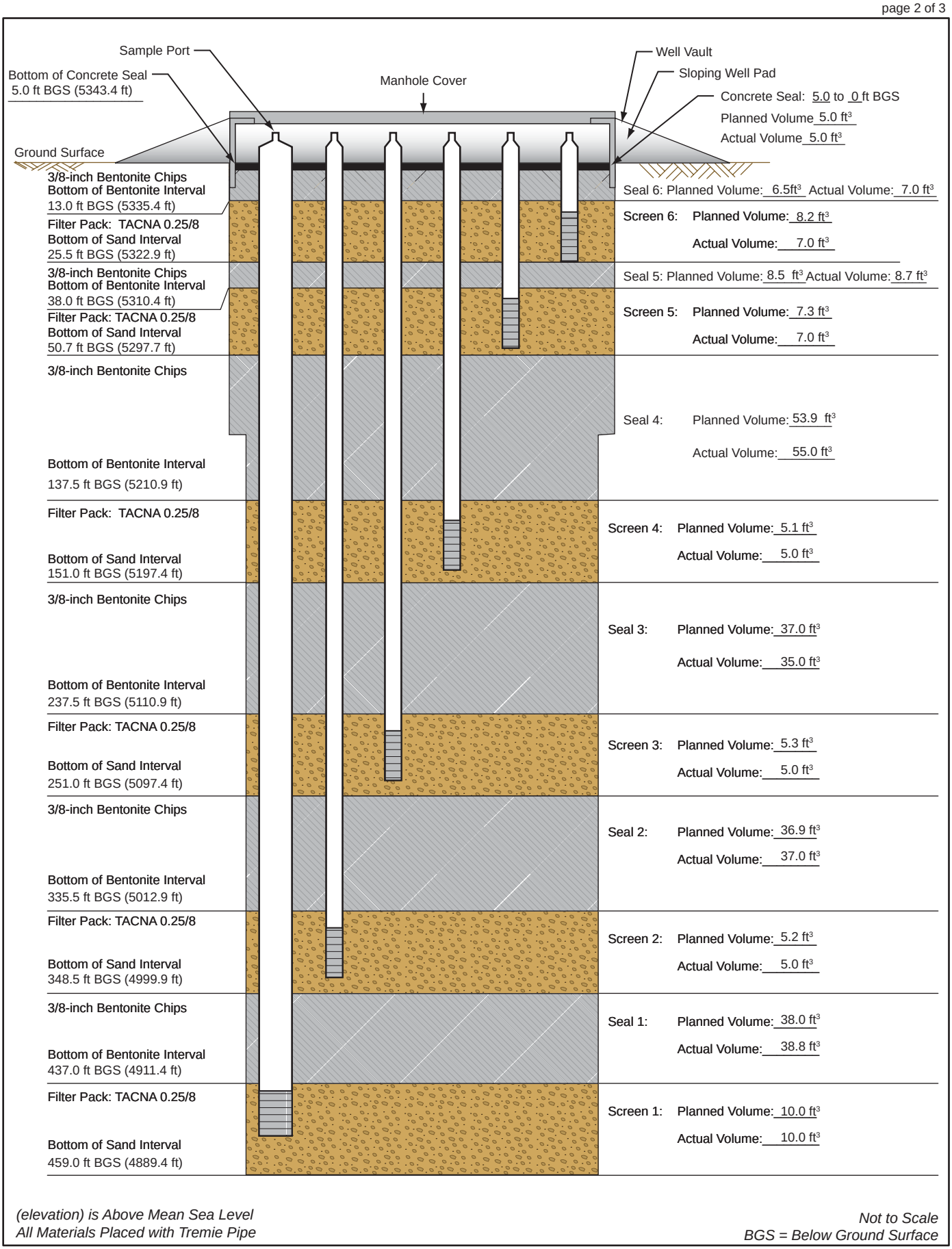



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106129






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

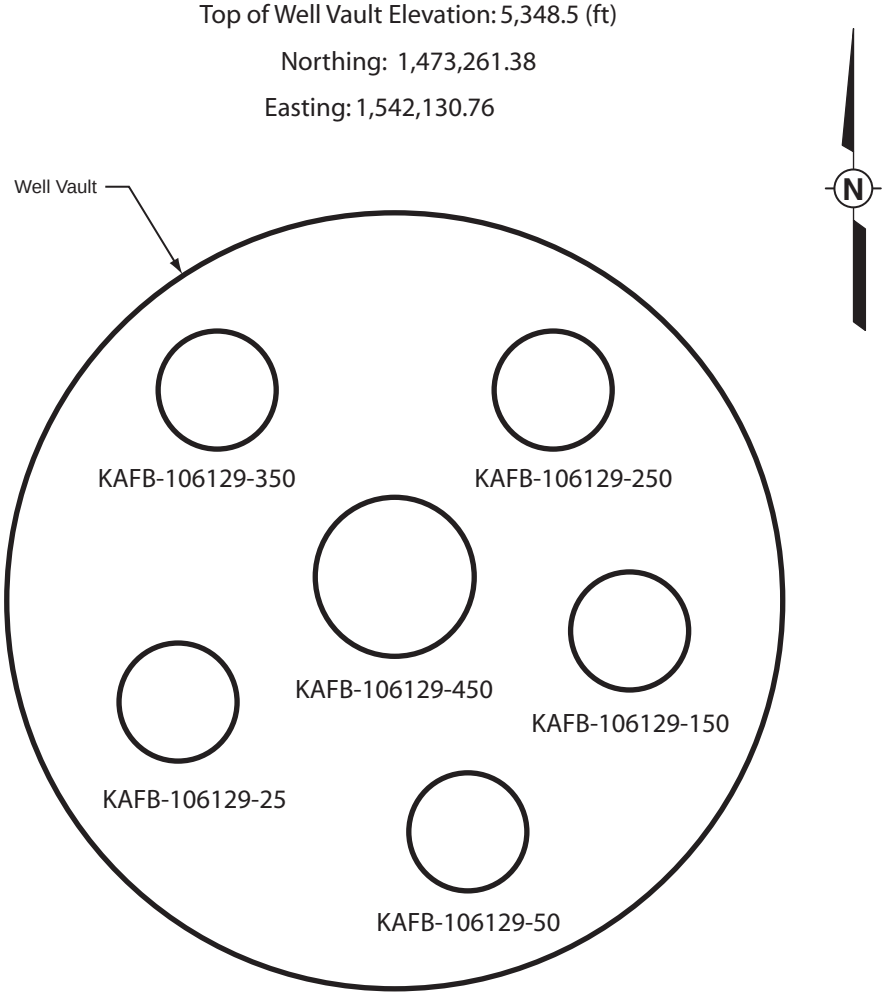
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106129



Top of Well Vault Elevation: 5,348.5 (ft)

Northing: 1,473,261.38

Easting: 1,542,130.76




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106129-25 | 3/4 | 25.1 | 15.1 - 25.1 | 1,473,260.77 | 1,542,130.54 | 5348.1 |
| KAFB-106129-50 | 3/4 | 49.7 | 39.7 - 49.7 | 1,473,260.63 | 1,542,130.82 | 5348.2 |
| KAFB-106129-150 | 3/4 | 150.2 | 140.2 - 150.2 | 1,473,260.87 | 1,542,131.04 | 5348.1 |
| KAFB-106129-250 | 3/4 | 250.1 | 240.1 - 250.1 | 1,473,261.13 | 1,542,130.92 | 5348.1 |
| KAFB-106129-350 | 3/4 | 347.4 | 337.4 - 347.4 | 1,473,261.10 | 1,542,130.63 | 5348.0 |
| KAFB-106129-450 | 3 | 450.7 | 440.7 - 450.7 | 1,473,260.99 | 1,542,130.79 | 5348.2 |

# Borehole ID: KAFB-106130

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/17/2011
Date TD Reached: 2/19/2011
Date Completed: 2/21/2011

Ground Elevation AMSL (ft): 5349.0
Y Coordinate: 1473567.70
X Coordinate: 1542131.09

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Sandy SILT (ML); brown (10YR 4/3); dry; very stiff; low plasticity; 60% silt; 40% very fine to medium sand; trace fine gravel to 1.2cm. | | Concrete Seal | Hand augered. |
| 5 | | | | | Same as above (0 ft). | | Bentonite Seal | Began drilling @ 1515 on 2/17/11. |
| 10 | | SB0314 | 0.0 | | | | | Blow counts (8.5-10'): 8/15. |
| | | | | | Sandy SILT (ML); brown (7.5YR 5/4); dry; very stiff; low plasticity; 70% silt; 25% fine sand; 5% fine gravel to 8mm. | | Top of Filter Pack | |
| 15 | | | | | Same as above (10 ft). | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 20 | | SB0315 | 0.0 | | | | | Blow counts (18.5-20'): 10/15. |
| | | | | | Sandy SILT (ML); reddish brown (5YR 4/4); moist; very stiff; low plasticity; 60% silt; 30% very fine sand; 10% coarse sand; trace fine gravel to 1cm; subangular. | | | Resumed drilling @ 1556. |
| 25 | | | | | SILT with Sand (ML); reddish brown (5YR 4/4); dry; nonplastic; 85% silt; 15% very fine sand. | | Bottom of Screen | |
| | | | | | | | Bentonite Seal | |
| 30 | | SB0316, SB0316- | 0.0 | | | | | Blow counts (28.5-30'): 13/37. |

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# Borehole ID: KAFB-106130

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/17/2011
Date TD Reached: 2/19/2011
Date Completed: 2/21/2011

Ground Elevation AMSL (ft): 5349.0
Y Coordinate: 1473567.70
X Coordinate: 1542131.09

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | | | | |
| | | MS SB0316-MSD | 0.0 | | SILT with Sand (ML); reddish brown (5YR 4/4); dry; hard; nonplastic; 85% silt; 15% very fine sand. | | Bentonite Seal | Blow counts (30-31.5'): Not Recorded. Resumed drilling @ 1639. |
| 35 | | | | | Same as above (30 ft); 75% silt; 10% clay; 15% very fine sand. | ML | Top of Filter Pack | |
| 40 | | SB0317 | 0.0 | | | | | Blow counts (38.5-40'): 12/44. |
| | | | | | Same as above (30 ft). | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1653. Resumed drilling @ 1705. Cyclone hose detached from cyclone @ 1709. Reattached cyclone hose and resumed drilling @ 1711. |
| 45 | | | | | Lean CLAY (CL); brown (7.5YR 5/4); dry; hard; low plasticity; 60% clay; 40% silt; trace coarse sand to 4mm; subangular. | CL | | |
| 50 | | SB0318 | 0.8 | | | | | Blow counts (48.5-50'): 17/50. Kelly down @ 1709. End of 02/17/11. Resume drilling @ 0815 on 02/18/11. |
| | | | | | | | Bottom of Screen | |
| | | | | | SILT (ML); light reddish brown (5YR 6/4); dry; hard; low plasticity; 90% silt; 10% fine sand; trace fine gravel to 8cm; rounded. | | | |
| 55 | | | | | SILT with Sand (ML); light reddish brown (5YR 6/4); dry; hard; low plasticity; 85% silt; 10% fine sand; 5% coarse sand to 2mm; rounded. | ML | Bentonite Seal | |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106130

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/17/2011
Date TD Reached: 2/19/2011
Date Completed: 2/21/2011

Ground Elevation AMSL (ft): 5349.0
Y Coordinate: 1473567.70
X Coordinate: 1542131.09

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Sandy SILT (ML); brown (7.5YR 5/3); dry; hard; nonplastic; 60% silt; 35% very fine to fine sand; 5% coarse sand; trace fine gravel to 2cm; rounded. | | | Resumed drilling @ 0842. |
| 65 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; hard; low plasticity; 85% silt; 15% very fine sand to 0.08mm. | ML | | |
| 70 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; loose; 100% very fine to fine sand to 0.2mm; rounded. | SP | | |
| 75 | | | | | Sandy SILT (ML); strong bown (7.5YR 4/6); dry; hard; low plasticity; 70% silt; 30% very fine to coarse sand; trace fine gravel to 5mm; subangular. | | Bentonite Seal | |
| 80 | | | | | SILT with Sand (ML); strong brown (7.5YR 4/6); dry; hard; low plasticity; 85% silt; 15% very fine sand to 0.08mm. | ML | | Kelly down @ 0850. Blew cuttings out of cyclone @ 0851. Resumed drilling @ 0907. |
| 85 | | | | | Same as above (80 ft); trace coarse sand to 3mm; subangular. | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106130

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/17/2011
Date TD Reached: 2/19/2011
Date Completed: 2/21/2011

Ground Elevation AMSL (ft): 5349.0
Y Coordinate: 1473567.70
X Coordinate: 1542131.09

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT with Sand (ML); strong brown (7.5YR 4/6); moist; hard; low plasticity; 85% silt; 15% very fine sand to 0.08mm. | | | |
| 95 | | | | | Same as above (90 ft); dry. | ML | | |
| 100 | | SB0319 | 0.7 | | Same as above (90 ft); dry; very stiff; trace clay nodules. | | | Blow counts (98.5-100'): 5/15. Kelly down @ 0925. Resumed drilling @ 0942. Cyclone hose blew off, stuck with sediment @ 0943. Flange replaced and cyclone reattached @ 1134. Resumed drilling @ 1143. |
| 105 | | | | | Silty SAND (SM); yellowish brown (10YR 5/4); dry; loose; 85% very fine to fine sand; trace gravel to 3.2cm; rounded; 15% silt. | SM | Bentonite Seal | |
| 110 | | | | | Lean CLAY (CL); brown (10YR 5/3); moist; hard; low plasticity; 70% clay; 30% silt. | CL | | |
| 115 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; very loose; 95% very fine to coarse sand; trace gravel to 6mm; rounded; 5% silt. Same as above (112 ft). | SW | | |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106130

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/17/2011
Date TD Reached: 2/19/2011
Date Completed: 2/21/2011

Ground Elevation AMSL (ft): 5349.0
Y Coordinate: 1473567.70
X Coordinate: 1542131.09

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Silty SAND (SM); brown (7.5YR 4/3); moist; very loose; 60% very fine to coarse sand; trace fine gravel to 1.5cm; rounded; 40% silt. | SM | | Kelly down @ 1155. Reached total depth with 11-3/4" casing. Resumed drilling @ 1556 with 9-5/8" casing. |
| 125 | | | | | SILT (ML); brown (7.5YR 5/4); moist; hard; low plasticity; 80% silt; 10% clay; 10% very fine sand to 0.1mm. | ML | | |
| 130 | | | | | Same as above (125 ft); trace coarse sand to 3mm; rounded. | | | |
| 135 | | | | | Lean CLAY (CL); brown (7.5YR 5/4); moist; hard; low plasticity; 80% clay; 20% silt. | CL | Bentonite Seal | |
| 140 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; hard; low plasticity; 85% silt; 15% very fine to coarse sand to 4mm. | ML | | |
| | | | | | Same as above (135); 75% silt; 10% clay; 15% very fine sand. | | | Resumed drilling @ 1619. |
| 145 | | | | | Lean CLAY (CL); brown (7.5YR 5/3); moist; hard; low plasticity; 90% clay; 10% silt. | CL | | |
| | | | | | Same as above (142 ft). | | Top of Filter Pack | |
| 150 | X | SB0320 | 0.5 | | Well graded SAND (SW); grayish brown (10YR 5/2); dry; very dense; 100% very fine to very coarse sand to 5mm; | SW | | Blow counts (148.5-150'): 29/50. |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/26/11 08:50 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106130

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/17/2011
Date TD Reached: 2/19/2011
Date Completed: 2/21/2011

Ground Elevation AMSL (ft): 5349.0
Y Coordinate: 1473567.70
X Coordinate: 1542131.09

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | subrounded. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Resumed drilling @ 1640. |
| 155 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); moist; hard; 70% silt; 5% clay; 15% very fine to coarse sand; 10% fine gravel to 2cm; well rounded. | ML | | |
| 160 | | | | | Well graded SAND with Silt (SW-SM); brown (10YR 5/3); dry; dense; 80% very fine to very coarse sand; 10% fine gravel to 2cm; subrounded; 10% silt. | SW-SM | Bottom of Screen | Resumed drilling @ 1655. |
| 165 | | | | | Lean CLAY (CL); brown (10YR 5/3); moist; hard; low plasticity; 80% clay; 20% silt. | CL | | |
| 170 | | | | | Sandy SILT (ML); brown (10YR 5/3); moist; hard; nonplastic; 70% silt; 30% very fine to very coarse sand to 4mm. | ML | Bentonite Seal | |
| 175 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; very loose; 100% fine to medium sand to 0.5mm; subrounded. | SP | | |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106130

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/17/2011
Date TD Reached: 2/19/2011
Date Completed: 2/21/2011

Ground Elevation AMSL (ft): 5349.0
Y Coordinate: 1473567.70
X Coordinate: 1542131.09

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND (SW); brown (10YR 5/3); damp; very loose; 95% fine to very coarse sand; trace fine gravel to 8mm; rounded; 5% fines. | | | Kelly down @ 1710. Resumed drilling @ 0900. |
| 185 | | | | | Same as above (180 ft); finer sand; trace clay nodules. | SW | | |
| 190 | | | | | Same as above (180 ft); finer sand. | | | |
| 195 | | | | | Well graded SAND with Silt (SW-SM); brown (10YR 5/3); damp; very loose; 90% very fine to coarse sand to 4mm; rounded; 10% silt with clay nodules. | SW-SM | Bentonite Seal | |
| 200 | | SB0321 | 0.3 | | Well graded SAND (SW); grayish brown (10YR 5/2); moist; very dense; 100% fine to very coarse sand; trace fine gravel to 1cm; subrounded. | SW | | Blow counts (198.5-200'): 12/50. Kelly down @ 0906. |
| 205 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; dense; 100% fine sand; rounded; trace fines. | SP | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106130

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/17/2011
Date TD Reached: 2/19/2011
Date Completed: 2/21/2011

Ground Elevation AMSL (ft): 5349.0
Y Coordinate: 1473567.70
X Coordinate: 1542131.09

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; dense; 85% fine sand; 15% medium to coarse sand; rounded; trace fines. | SP | | |
| 215 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; dense; 100% very fine to coarse sand to 3mm; rounded. | SW | | |
| 220 | | | | | Lean CLAY (CL); dark yellowish brown (10YR 4/4); damp; low plasticity; 60% clay; 40% silt. | CL | | Kelly down @ 0931. Resumed drilling @ 0941. |
| 225 | | | | | Silty SAND with Gravel (SM): brown (10YR 5/3); damp; dense; 60% fine to very coarse sand; 20% fine gravel to 2cm; well rounded; 20% silt.<br>Same as above (221 ft). | SM | Bentonite Seal | |
| 230 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); damp; dense; 100% very fine to coarse sand to 4mm; subrounded. | SW | | |
| 235 | | | | | Same as above (228 ft); trace fine gravel to 1.2cm. | | | |
| 240 | | | | | | | Top of Filter Pack | |

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# Borehole ID: KAFB-106130

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/17/2011
Date TD Reached: 2/19/2011
Date Completed: 2/21/2011

Ground Elevation AMSL (ft): 5349.0
Y Coordinate: 1473567.70
X Coordinate: 1542131.09

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); damp; dense; 95% very fine to very coarse sand; 5% gravel to 1.5cm; subrounded; pumice dominant. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 0949. Resumed drilling @ 0957. Bit packed off. |
| 245 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); damp; dense; 100% very fine to coarse sand to 4mm; subrounded. | | | |
| 250 | | SB0322 | 0.7 | | Same as above (245 ft); coarser; trace gravel to 1.8cm. | | Bottom of Screen | Blow counts (248.5-250'): 6/12/50. Resumed drilling @ 1023. |
| 255 | | | | | Same as above (245 ft); grading finer. | | | |
| 260 | | | | | Lean CLAY (CL); brown (10YR 5/3); moist; hard; 80% clay; 20% silt. | CL | Bentonite Seal | Kelly down @ 1027. Resumed drilling @ 1033. |
| 265 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); dry; dense; 95% very fine to coarse sand to 3mm; rounded; 5% fines. | SW | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106130

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/17/2011
Date TD Reached: 2/19/2011
Date Completed: 2/21/2011

Ground Elevation AMSL (ft): 5349.0
Y Coordinate: 1473567.70
X Coordinate: 1542131.09

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | SILT with Sand (ML); brown (10YR 5/3); damp; hard; 70% silt; 10% clay; 20% very fine to medium sand to 0.5mm. | ML | | |
| 275 | | | | | Silty SAND (SM); brown (10YR 4/3); moist; dense; 70% very fine to medium sand; 30% silt. | SM | | |
| 280 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% very fine to coarse sand to 4mm; subrounded; 5% fines. | SW | | Kelly down @ 1040. Resumed drilling @ 1048. |
| 285 | | | | | Same as above (280 ft). | | Bentonite Seal | |
| | | | | | Lean CLAY (CL); brown (7.5YR 4/4); moist; hard; low plasticity; 70% clay; 30% silt. | CL | | |
| 290 | | | | | Clayey SAND (SC); dark yellowish brown (10YR 4/4); moist; very dense; 80% very fine to very coarse sand; 20% clay with silt. | SC | | |
| 295 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; very dense; 90% very fine to very coarse sand; 5% fine gravel to 2.2cm; subrounded; 5% silt. | SW | | |
| 300 | X | SB0323 | 0.9 | | | | | Blow counts (298.5-300'): 31/50. |

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# Borehole ID: KAFB-106130

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/17/2011
Date TD Reached: 2/19/2011
Date Completed: 2/21/2011

Ground Elevation AMSL (ft): 5349.0
Y Coordinate: 1473567.70
X Coordinate: 1542131.09

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | | | | |
| | | SB0324 | 0.9 | | Well graded SAND (SW); brown (10YR 5/3); dry; very dense; 90% very fine to very coarse sand; 5% fine gravel to 2.2cm; subrounded; 5% silt. | SW | | Blow counts (300-301.5'): Not Recorded. Kelly down @ 1055. Resumed drilling @ 1119. |
| 305 | | | | | No cuttings returned. | | | |
| 310 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; very dense; 85% very fine to very coarse sand; 10% fine gravel to 3.5cm; subrounded; 5% silt. | | | |
| 315 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; very dense; 90% very fine to very coarse sand; 5% fine gravel to 2.2cm; subrounded; 5% silt. | | Bentonite Seal | |
| 320 | | | | | Same as above (315 ft). | SW | | Kelly down @ 1126. Resumed drilling @ 1133. |
| 325 | | | | | Well graded SAND with Gravel (SW); grayish brown (10YR 5/2); dry; very dense; 75% fine to very coarse sand; 25% fine gravel to 2.3cm; well rounded. | | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106130

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/17/2011
Date TD Reached: 2/19/2011
Date Completed: 2/21/2011

Ground Elevation AMSL (ft): 5349.0
Y Coordinate: 1473567.70
X Coordinate: 1542131.09

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND with Gravel (SW); grayish brown (10YR 5/2); dry; very dense; 60% fine to very coarse sand; 35% fine gravel to 2.3cm; well rounded; 5% silt. | | Bentonite Seal | |
| 335 | | | | | Same as above (330 ft); 85% very fine to very coarse sand; 15% fine gravel to 2.4cm. | SW | | |
| 340 | | | | | | | Top of Filter Pack | |
| | | | | | Silty SAND (SM); brown (10YR 4/3); moist; very dense; 85% very fine to coarse sand; trace fine gravel to 6mm; subrounded; 15% silt with clay nodules. | SM | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1140. Resumed drilling @ 1230. |
| 345 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; very dense; 90% very fine to very coarse sand; subangular; 5% fine gravel to 1.6cm; well rounded; 5% silt. | | | |
| 350 | | SB0325 | 0.6 | | | SW | | Blow counts (348.5-350'): 10/12. |
| | | | | | Same as above (343 ft); medium dense; trace clay nodules. | | Bottom of Screen | Resumed drilling @ 1251. |
| 355 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); dark grayish brown (10YR 4/2); dry; medium dense; 100% fine to medium sand; trace coarse sand to 4mm; rounded. | SP | Bentonite Seal | |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106130

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/17/2011
Date TD Reached: 2/19/2011
Date Completed: 2/21/2011

Ground Elevation AMSL (ft): 5349.0
Y Coordinate: 1473567.70
X Coordinate: 1542131.09

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Poorly graded SAND (SP); dark grayish brown (10YR 4/2); dry; medium dense; 100% fine to medium sand; trace coarse sand to 4mm; rounded. | SP | | Kelly down @ 1254. Resumed drilling @ 1301. |
| 365 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 95% very fine to very coarse sand; trace fine gravel to 7mm; rounded; 5% silt. | | | |
| 370 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); dry; dense; 85% very fine to very coarse sand; 15% fine gravel to 3.5cm; rounded. | | | |
| 375 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 95% very fine to very coarse sand; trace fine gravel to 7mm; rounded; 5% silt. | SW | Bentonite Seal | |
| 380 | | | | | Same as above (375 ft); moist; trace clay nodules. | | | Kelly down @ 1306. Resumed drilling @ 1315. |
| 385 | | | | | Same as above (375 ft); trace clay nodules. | | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106130

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/17/2011
Date TD Reached: 2/19/2011
Date Completed: 2/21/2011

Ground Elevation AMSL (ft): 5349.0
Y Coordinate: 1473567.70
X Coordinate: 1542131.09

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); dry; dense; 95% very fine to very coarse sand; 5% fine gravel to 1cm; rounded; trace fines. | SW | | |
| 395 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 85% fine gravel to 2.2cm; subangular to rounded; 15% very fine to very coarse sand; rounded; trace fines. | GP | | |
| 400 | | SB0326 | 0.6 | | Well graded SAND (SW); brown (10YR 5/3); moist; very dense; 95% very fine to very coarse sand; 5% fine gravel to 1.1cm; subrounded. | | | Blow counts (398.5-400'): 15/50.<br>Kelly down @ 1321. Resumed drilling @ 1340. |
| 405 | | | | | Same as above (398 ft); no gravel. | | Bentonite Seal | |
| 410 | | | | | Same as above (398 ft); grading finer. | SW | | |
| 415 | | | | | Same as above (398 ft); finer. | | | |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106130

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/17/2011
Date TD Reached: 2/19/2011
Date Completed: 2/21/2011

Ground Elevation AMSL (ft): 5349.0
Y Coordinate: 1473567.70
X Coordinate: 1542131.09

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; very dense; 95% very fine to very coarse sand; 5% fine gravel to 1.1cm; subrounded. | | | Kelly down @ 1348. Resumed drilling @ 1359. |
| 425 | | | | | Same as above (420 ft); finer. | | Bentonite Seal | |
| 430 | | | | | Same as above (420 ft); coarser. | SW | | |
| 435 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; very dense; 95% very fine to very coarse sand to 4mm; rounded; 5% fines. | | Top of Filter Pack | |
| 440 | | | | | Same as above (435 ft); coarser. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1409. Resumed drilling @ 1420. |
| 445 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; very dense; 100% very fine to medium sand to 1mm; rounded; trace fines. | SP | | |
| 450 | X | SB0327 | 1.3 | | | | | Blow counts (448.5-450'): 50/50. |

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# Borehole ID: KAFB-106130

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/17/2011
Date TD Reached: 2/19/2011
Date Completed: 2/21/2011

Ground Elevation AMSL (ft): 5349.0
Y Coordinate: 1473567.70
X Coordinate: 1542131.09

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | |
| | | SB0327 | | | Well graded SAND (SW); brown (10YR 4/3); dry; very dense; 100% very fine to very coarse sand; trace gravel to 2.5cm; subrounded. | SW | Bottom of Screen | Blow counts (450-451.5'): Not Recorded. Blow counts (451.5-453'): Not Recorded. Resumed drilling @ 1500. Bit packed off @ 1503. Resumed drilling @ 1506. Total depth = 455 ft. Reached @ 1512 on 02/19/2011. |
| | | SB0327 | | | | | | |
| 455 | | | | | | | | |
| 460 | | | | | | | | Water added during drilling (gallons) = 0 |
| 465 | | | | | | | | Water added during construction (gallons) = Not Recorded |
| 470 | | | | | | | | Kelly down: TD the joint and ready to make new connection |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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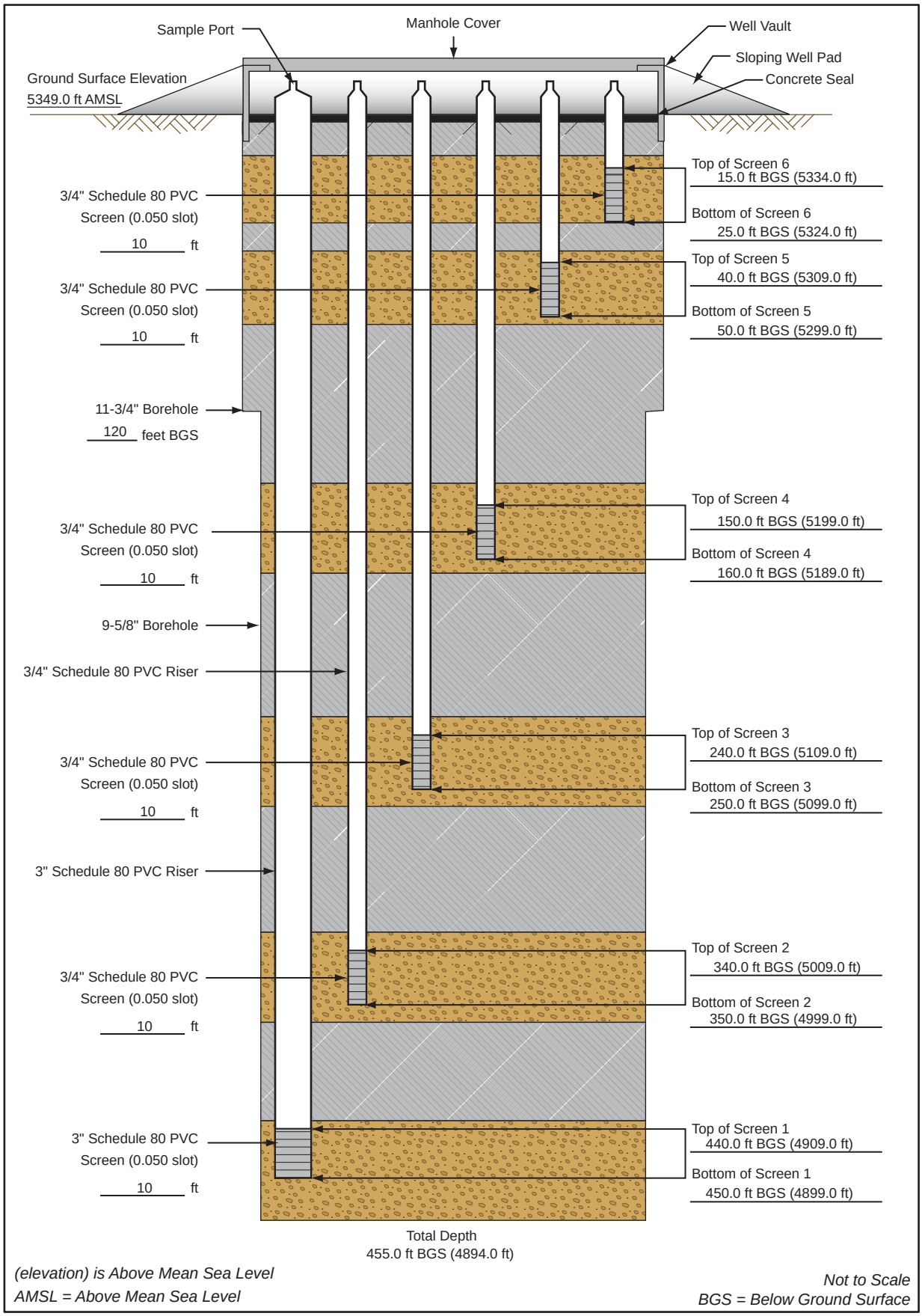
# Nested Soil Vapor Well Completion Diagram for KAFB-106130

Installation Start Date/Time: 2/20/2011 @ 09:22
Installation End Date/Time: 2/21/2011 @ 16:45





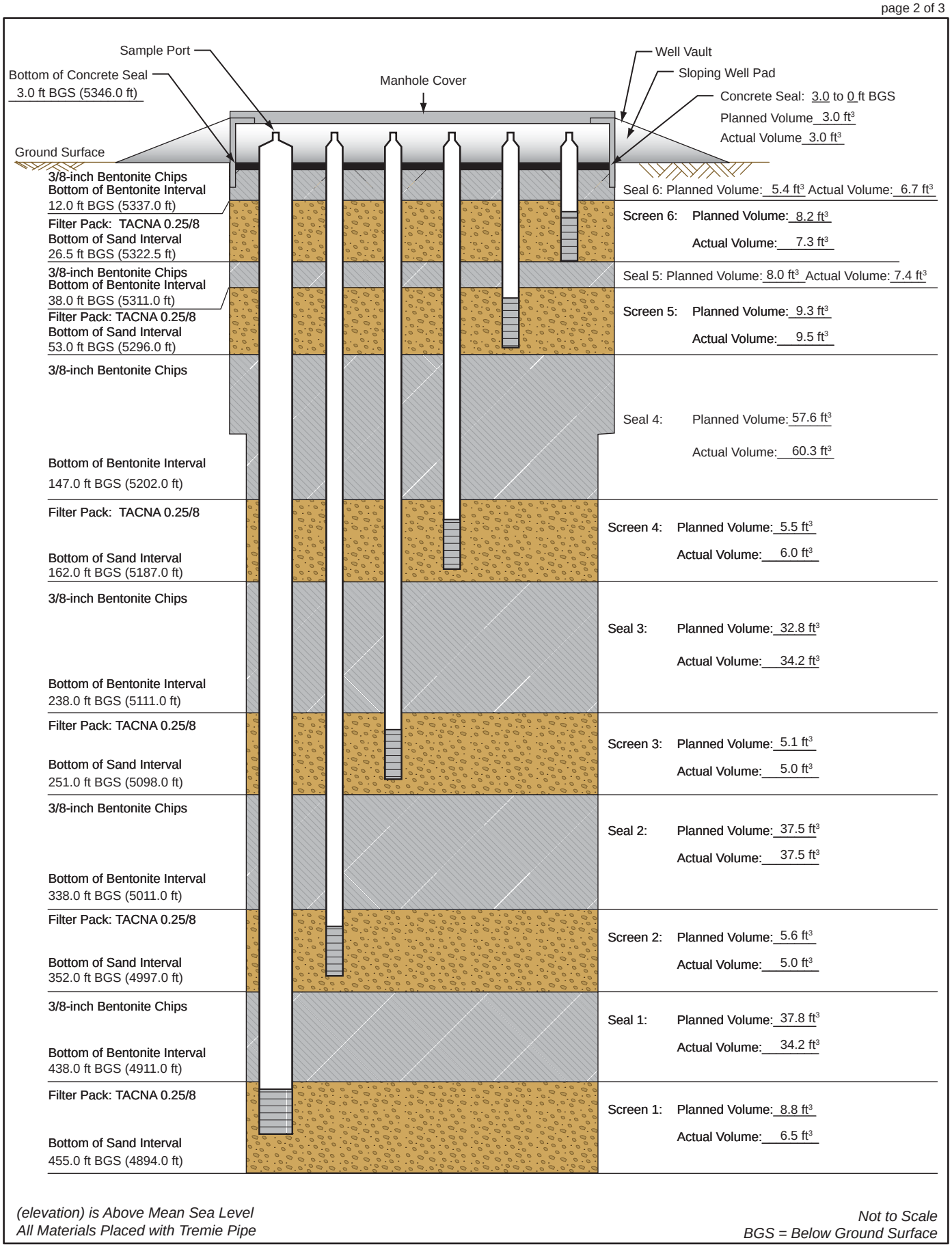

*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

140705_CA010020_SV_KAFB.106130 (a)

# Nested Soil Vapor Well Completion Diagram for KAFB-106130






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

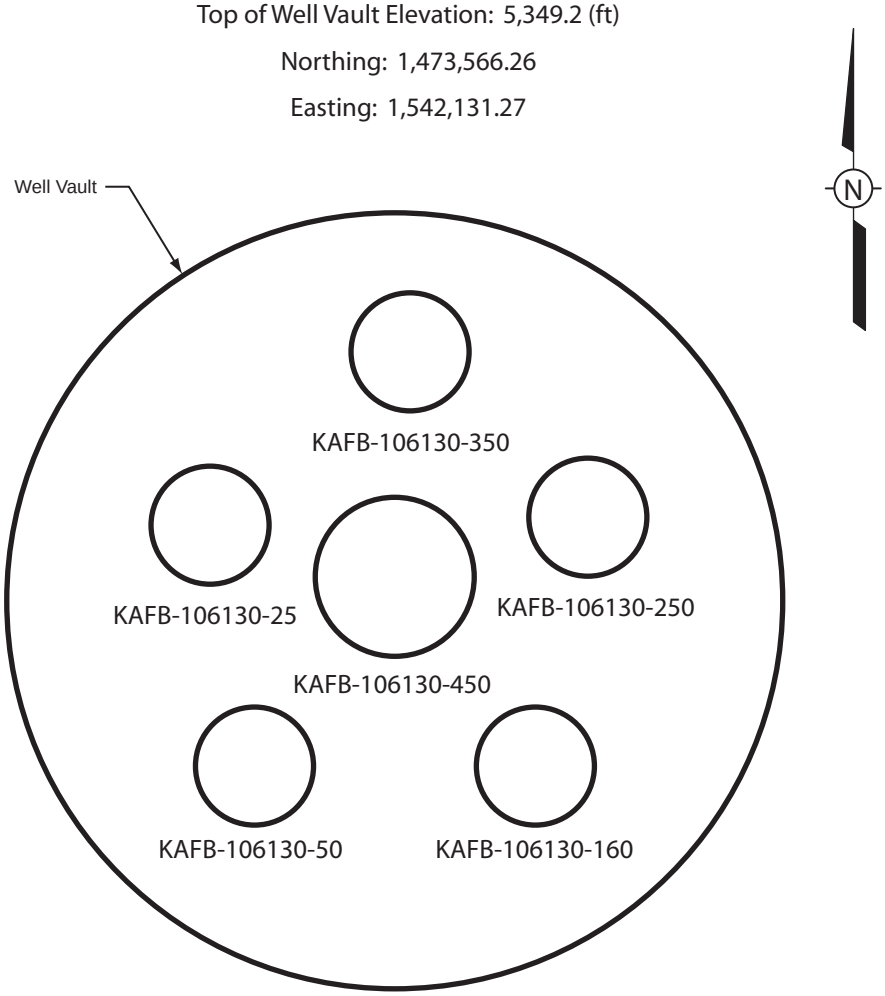
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106130



Top of Well Vault Elevation: 5,349.2 (ft)

Northing: 1,473,566.26

Easting: 1,542,131.27




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106130-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1,473,565.67 | 1,542,130.89 | 5348.7 |
| KAFB-106130-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1,473,565.54 | 1,542,131.10 | 5348.7 |
| KAFB-106130-160 | 3/4 | 160.0 | 150.0 - 160.0 | 1,473,565.64 | 1,542,131.37 | 5348.7 |
| KAFB-106130-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1,473,565.92 | 1,542,131.32 | 5348.7 |
| KAFB-106130-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1,473,566.00 | 1,542,131.05 | 5348.7 |
| KAFB-106130-450 | 3 | 450.0 | 440.0 - 450.0 | 1,473,565.86 | 1,542,131.11 | 5348.8 |

# Borehole ID: KAFB-106131

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/2/2011
Date TD Reached: 3/5/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5344.4
Y Coordinate: 1472929.18
X Coordinate: 1541690.65

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Sandy SILT (ML); red (2.5YR 5/6); moist; firm; 70% silt; 30% very fine to fine sand; trace fine to coarse gravel to 5cm; no odor. | ML | Concrete Seal | Hand augered. |
| 5 | | | | | Same as above (0 ft); more gravel. | | | Began drilling @ 1225 on 3/2/11. |
| 10 | | SB0328 | 0.1 | | | | Bentonite Seal | Blow counts (8.5-10'): 11/22/26. |
| | | | | | Lean CLAY (CL); light reddish brown (5YR 6/4); moist; soft; low to medium plasticity; 95% clay; 5% sand; no odor. | CL | Top of Filter Pack | New 10' connection @ 1245. |
| 15 | | | | | Same as above (10 ft). | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 20 | | SB0329 | 0.0 | | | | | Blow counts (18.5-20'): 17/25/27. |
| | | | | | Same as above (10 ft). | | | New 10' connection @ 1310. |
| 25 | | | | | Silty GRAVEL (GM); reddish brown (5YR 5/4); moist; 70% gravel; angular to subrounded; 30% silt; no odor. | GM | Bottom of Screen | |
| | | | | | Lean CLAY (CL); yellowish red (5YR 4/6); moist; soft; low plasticity; 70% clay; 20% silt; 10% gravel; angular to subrounded; no odor. | CL | Bentonite Seal | |
| 30 | | SB0330 | 0.0 | | | | | Blow counts (28.5-30'): 11/22/31. Blow counts |

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# Borehole ID: KAFB-106131

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/2/2011
Date TD Reached: 3/5/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5344.4
Y Coordinate: 1472929.18
X Coordinate: 1541690.65

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | | | | |
| | | SB0331 | 0.0 | | Lean CLAY (CL); yellowish red (5YR 4/6); moist; hard; low plasticity; 70% clay; 20% silt; 10% gravel; angular to subrounded; no odor. | CL | | (30-31.5'): 12/26/50. New 10' connection @ 1345. |
| | | | | | GRAVEL (GW); lense. | GW | | |
| 35 | | | | | Lean CLAY with Gravel (CL); pink (5YR 7/4); moist; medium plasticity; 80% clay; 20% gravel to 0.75cm; no odor. | | Bentonite Seal | |
| 40 | | SB0332 | 0.0 | | | | | Blow counts (38.5-40'): 16/28/46. New 10' connection @ 1405. |
| | | | | | Lean CLAY with Sand (CL); yellowish red (5YR 5/6); moist; firm; non to low plasticity; 80% clay; 20% sand; no odor. | CL | Top of Filter Pack | |
| 45 | | | | | Same as above (40 ft). | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 50 | | SB0333 | 0.0 | | | | | Blow counts (48.5-50'): 9/15/46. Blow counts (50-51.5'): 11/42/50. New 10' connection @ 1435. |
| | | SB0333 | | | Well graded SAND with Gravel (SW); pink (5YR 7/4); dry to moist; 70% sand; 30% coarse gravel to 2cm; subangular; no odor. | SW | | |
| 55 | | | | | | | Bottom of Screen | |
| | | | | | Lean CLAY with Sand (CL); yellowish red (5YR 5/6); moist; firm; non to low plasticity; 80% clay; 20% sand; no odor. | CL | Bentonite Seal | |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106131

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/2/2011
Date TD Reached: 3/5/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5344.4
Y Coordinate: 1472929.18
X Coordinate: 1541690.65

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Gravelly SILT (ML); reddish yellow (5YR 6/6); moist; soft; 55% silt; 45% gravel to 1cm; rounded; no odor. | | | New 20' connection @ 1445. |
| 65 | | | | | Same as above (60 ft); 70% silt; 30% gravel. | | | |
| 70 | | | | | Same as above (60 ft). | | | |
| 75 | | | | | SILT (ML); reddish yellow (5YR 6/6); moist; soft; 70% silt; 25% clay; 5% gravel to 2cm; rounded. | ML | Bentonite Seal | |
| 80 | | | | | SILT (ML); reddish yellow (5YR 6/6); dry; soft; low plasticity; 65% silt; 30% clay; 5% gravel; no odor. | | | New 20' connection @ 1500. |
| 85 | | | | | Same as above (80 ft); 10% gravel. | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106131

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/2/2011
Date TD Reached: 3/5/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5344.4
Y Coordinate: 1472929.18
X Coordinate: 1541690.65

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Lean CLAY (CL); light brown (7.5YR 6/4); dry; hard; non to low plasticity; 85% clay; 15% silt; no odor. | CL | | |
| 95 | | | | | Silty SAND (SM); light brown (7.5YR 6/4); moist; loose to dense; 75% sand; 25% silt with clay; no odor. | SM | | |
| 100 | | SB0334 | 0.0 | | | | | Blow counts (98.5-100'): 6/8/12. Blow counts (100-101.5'): 16/19/22. New 20' connection @ 1530. |
| 105 | | SB0334 | | | Clayey SAND with Gravel (SC); light brown (7.5YR 6/3); dry; loose to dense; 40% sand; 25% fine to coarse gravel; 35% clay; no odor. | SC | Bentonite Seal | |
| 110 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/3); dry; loose; 100% fine to coarse sand; no odor. | SP | | |
| 115 | | | | | SILT (ML); reddish yellow (5YR 6/6); moist; hard; low plasticity; 65% silt; 30% clay; 5% gravel; no odor. | ML | | |
| 120 | | | | | Same as above (110 ft). | | | End of 3/2/11. |

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# Borehole ID: KAFB-106131

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/2/2011
Date TD Reached: 3/5/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5344.4
Y Coordinate: 1472929.18
X Coordinate: 1541690.65

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT (ML); reddish yellow (5YR 6/6); moist; hard; low plasticity; 65% silt; 30% clay; 5% gravel; no odor. | ML | | New 20' connection @ 0855 on 3/3/11. |
| 125 | | | | | Lean CLAY (CL); brown (7.5YR 5/4); moist; soft; medium to high plasticity; 95% clay with silt; 5% gravel to 2cm; no odor. | | Bentonite Seal | |
| 130 | | | | | Same as above (125 ft). | CL | | |
| 135 | | | | | Same as above (125 ft). | | Top of Filter Pack | |
| 140 | | | | | Well graded SAND (SW); light brown (7.5YR 6/4); moist; dense to medium dense; 100% sand; subangular; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | New 10' connection @ 0920. |
| 145 | | | | | Same as above (140 ft); brown (7.5YR 5/3). | SW | | |
| 150 | X | SB0335 SB0335- | 0.0 | | | | | Blow counts (148.5-150'): 24/27/54. Blow counts |

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# Borehole ID: KAFB-106131

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/2/2011
Date TD Reached: 3/5/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5344.4
Y Coordinate: 1472929.18
X Coordinate: 1541690.65

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | MS SB0335-MSD | 0.0 | | SILT (ML): reddish yellow (5YR 6/6); moist; hard; non to low plasticity; 95% silt with clay; 5% sand; no odor. | ML | Bottom of Screen | (150-151.5'): 15/26/42. New 10' connection @ 0955. |
| 155 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/4); moist; dense to medium dense; 95% sand; 5% fine gravel to 1cm; no odor. | SP | | |
| 160 | | | | | Same as above (155 ft). | | | New 20' connection @ 1005. |
| 165 | | | | | Same as above (155 ft); 10% gravel to 0.5cm; coarsens downward. | | Bentonite Seal | |
| 170 | | | | | Same as above (155 ft). | | | |
| 175 | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/3); moist; medium dense; 65% sand; 35% coarse gravel to 0.75cm; subrounded to subangular; no odor. | SW | | |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106131

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/2/2011
Date TD Reached: 3/5/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5344.4
Y Coordinate: 1472929.18
X Coordinate: 1541690.65

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/4); moist; dense; 95% sand; 5% fine gravel; no odor. | SP | | New 20' connection @ 1025. |
| 185 | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/3); moist; 80% sand; 15% gravel; 5% silt and clay; no odor. | SW | | |
| 190 | | | | | Same as above (185 ft). | | | |
| 195 | | | | | SILT (ML); brown (7.5YR 5/3); moist; soft; 90% silt with clay; 10% gravel to 2.5cm; subrounded; no odor. | ML | Bentonite Seal | |
| 200 | | SB0336 | 0.0 | | Lean CLAY (CL); brown (7.5YR 5/4); dry; hard; non to low plasticity; 95% clay with silt; 5% sand; no odor. | CL | | Blow counts (198.5-200'): 16/32/41. New 20' connection @ 1110. |
| 205 | | | | | Well graded SAND (SW); brown (7.5YR 5/3); dry; loose to medium dense; 100% sand; no odor. | SW | | |
| 210 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/26/11 13:14 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106131

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/2/2011
Date TD Reached: 3/5/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5344.4
Y Coordinate: 1472929.18
X Coordinate: 1541690.65

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Gravelly lean CLAY (CL); light brown (7.5YR 6/4); dry; hard; medium to high plasticity; 70% clay with silt; 30% gravel to 5cm; rounded to well rounded; no odor. | CL | | |
| 215 | | | | | Same as above (210 ft). | | | |
| | | | | | Poorly graded SAND (SP); lense. | SP | | |
| 220 | | | | | Gravelly lean CLAY (CL); light brown (7.5YR 6/4); dry; hard; medium to high plasticity; 70% clay with silt; 30% gravel to 5cm; rounded to well rounded; no odor. | CL | Bentonite Seal | |
| | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/3); moist; 85% sand; 15% coarse gravel to 0.5cm; no odor. | SW | | |
| 225 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/3); dry to moist; 90% sand; 10% coarse gravel; no odor. | | | |
| 230 | | | | | Same as above (224 ft). | SP | | |
| 235 | | | | | | | Top of Filter Pack | |
| | | | | | Well graded GRAVEL with Clay and Sand (GW-GC); brown (7.5YR 5/4); moist; loose to medium dense; 60% gravel to 3cm; subangular to rounded; 30% sand; 10% clay and silt; no odor. | GW-GC | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106131

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/2/2011
Date TD Reached: 3/5/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5344.4
Y Coordinate: 1472929.18
X Coordinate: 1541690.65

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | | | | |
| | | | | | Well graded GRAVEL with Clay (GW-GC); brown (7.5YR 5/4); moist; loose to medium dense; 85% gravel to 3cm; subangular to rounded; 5% sand; 10% clay and silt; no odor. | GW-GC | | New 10' connection @ 1235. |
| 245 | | | | | | | Bottom of Screen | |
| | | | | | Lean CLAY (CL); light brown (7.5YR 6/4); dry; hard; medium to high plasticity; clay with silt; gravel; no odor. | CL | | |
| 250 | | SB0337 | 0.0 | | | | | Blow counts (248.5-250'): 19/46/50. |
| | | | | | Same as above (245 ft); nonplastic; no gravel. | | | New 10' connection @ 1310. |
| 255 | | | | | | | Bentonite Seal | |
| | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/3); dry to moist; medium dense to loose; sand; gravel to 1cm; rounded; silt; no odor. | SW | | |
| 260 | | | | | | | | |
| | | | | | Lean CLAY (CL); brown (7.5YR 5/4); moist; hard; medium plasticity; clay with silt; no odor. | CL | | New 20' connection @ 1505. |
| 265 | | | | | | | | |
| | | | | | Lean CLAY with Gravel (CL); brown (7.5YR 5/4); moist; hard; medium plasticity; 85% clay with silt; 15% gravel to 4cm; subrounded to subangular; no odor. | | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106131

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/2/2011
Date TD Reached: 3/5/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5344.4
Y Coordinate: 1472929.18
X Coordinate: 1541690.65

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Lean CLAY (CL); brown (7.5YR 5/4); moist; hard; medium plasticity; 100% clay with silt; no odor. | CL | | |
| 275 | | | | | Same as above (270 ft). | | | |
| 280 | | | | | Well graded SAND with Gravel (SW); pink (7.5YR 7/3); dry; loose; 85% sand; 15% coarse gravel; no odor. | SW | | New 20' connection @ 1550. |
| 285 | | | | | Same as above (278 ft); 40% gravel; angular to subrounded. | | Bentonite Seal | |
| 290 | | | | | Poorly graded SAND (SP); very coarse; angular to subangular. | SP | | |
| 295 | | | | | Same as above (290 ft); fines downward. | | | |
| 300 | | SB0338 | 0.0 | | GRAVEL (GP); lense; gravel to 2cm; | GP | | Blow counts (298.5-300'): 10/26/41. |

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# Borehole ID: KAFB-106131

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/2/2011
Date TD Reached: 3/5/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5344.4
Y Coordinate: 1472929.18
X Coordinate: 1541690.65

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | rounded. | | | End of 3/3/11. New 20' connection @ 0805 on 3/4/11. |
| | | | | | Gravelly SILT (ML); reddish yellow (7.5YR 7/6); dry to damp; 70% silt; 30% gravel to 3cm; subangular to subrounded; no odor. | ML | | |
| 305 | | | | | Well graded SAND with Gravel (SW); pink (7.5YR 7/3); dry; loose; 70% sand; 30% coarse gravel to 5cm; subangular to rounded; no odor. | | | |
| 310 | | | | | Same as above (305 ft); 45% gravel. | SW | | |
| 315 | | | | | Same as above (305 ft); more angular gravel. | | Bentonite Seal | |
| 320 | | | | | Well graded GRAVEL with Sand (GW); dry; 80% gravel; angular to subrounded; 20% coarse sand; no odor. | GW | | |
| | | | | | Well graded SAND with Gravel (SW); pink (7.5YR 7/3); dry; loose; 60% sand; 40% gravel to 5cm; subangular to rounded; no odor. | | | New 20' connection @ 1045. |
| 325 | | | | | Well graded SAND (SW); pink (7.5YR 7/3); dry; loose; 90% sand; 10% gravel to 1cm; subangular to rounded; no odor. | SW | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106131

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/2/2011
Date TD Reached: 3/5/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5344.4
Y Coordinate: 1472929.18
X Coordinate: 1541690.65

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Poorly graded SAND (SP); pink (7.5YR 7/3); dry; 80% fine sand; 20% medium to coarse sand; no odor. | SP | | |
| | | | | | Well graded GRAVEL with Sand (GW); pink (7.5YR 7/3); dry; loose; 80% gravel to 2.5cm; angular to subrounded; 20% coarse sand; no odor. | GW | Bentonite Seal | |
| 335 | | | | | | | | |
| | | | | | Well graded SAND with Gravel (SW); pink (7.5YR 7/3); dry to damp; loose; 60% sand; 45% coarse gravel to 1cm; subangular to subrounded; no odor. | SW | Top of Filter Pack |
| 340 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); pink (7.5YR 7/3); dry; 80% fine sand; 20% medium to coarse sand; no odor. | SP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | New 10' connection @ 1150. |
| 345 | | | | | Same as above (340 ft); light brown (7.5YR 6/4); moist; trace gravel to 2cm; rounded to subangular. | | | |
| | | SB0339 | 0.0 | | | | | Blow counts (348-349.5'): 9/35/50. Blow counts (349.5-351'): 49/50. New 10' connection @ 1255. |
| 350 | | SB0339 | | | | | Bottom of Screen | |
| | | | | | Well graded GRAVEL (GW); pink (7.5YR 7/3); dry; 90% gravel to 7cm; subangular to rounded; 10% coarse sand; no odor. | GW | | |
| 355 | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/3); moist; loose to medium dense; 70% sand; 30% gravel to 1cm; subangular to subrounded; no odor. | SW | Bentonite Seal | |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106131

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/2/2011
Date TD Reached: 3/5/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5344.4
Y Coordinate: 1472929.18
X Coordinate: 1541690.65

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/3); moist; loose to medium dense; 70% sand; 30% gravel to 3cm; subangular to subrounded; no odor. | SW | | New 20' connection @ 1440. |
| 365 | | | | | Poorly graded SAND with Gravel (SP); light brown (7.5YR 6/4); dry; 80% very fine to fine sand; 20% gravel to 4cm; rounded to subangular; no odor. | | | |
| 370 | | | | | Same as above (365 ft); coarser. | | | |
| 375 | | | | | Same as above (365 ft); finer. | SP | Bentonite Seal | |
| 380 | | | | | Poorly graded SAND with Gravel (SP); pink (7.5YR 7/3); dry; loose; 65% coarse sand; 35% gravel to 0.25cm; angular to subrounded; no odor. | | | New 20' connection @ 1615. |
| 385 | | | | | Same as above (381 ft); moist. | | | |
| 390 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/3); moist; loose; 100% fine sand; no odor. | | | End of 3/4/11. |

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# Borehole ID: KAFB-106131

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/2/2011
Date TD Reached: 3/5/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5344.4
Y Coordinate: 1472929.18
X Coordinate: 1541690.65

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/3); moist; loose; 100% fine sand; no odor. | SP | | |
| 395 | | | | | Silty SAND (SM); strong brown (7.5YR 5/6); moist; dense; 60% sand; 10% gravel; 30% silt; no odor. | SM | | |
| | | | | | Same as above (393 ft); dry. | | | |
| 400 | | SB0340 SB1749 | 0.0 | | Same as above (393 ft); light brown (7.5YR 6/4). | | | Blow counts (398-399.5'): 16/37/43. New 20' connection @ 1215 on 3/5/11. |
| | | | | | Well graded SAND (SW); dry; lense. | SW | | |
| 405 | | | | | Silty SAND (SM); light brown (7.5YR 6/4); moist; dense; 60% sand; 10% gravel; 30% silt; no odor. | SM | Bentonite Seal | |
| 410 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/3); dry; loose; 90% very fine to fine sand; 10% gravel to 2cm; angular; no odor. | SP | | |
| 415 | | | | | Well graded SAND (SW); pinkish gray (7.5YR 7/2); damp; loose; 100% sand to 0.3cm; no odor. | SW | | |
| 420 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/3); dry; loose; 100% sand; no odor. | SP | | |

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# Borehole ID: KAFB-106131

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/2/2011
Date TD Reached: 3/5/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5344.4
Y Coordinate: 1472929.18
X Coordinate: 1541690.65

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/3); dry; loose; 100% sand; no odor. | SP | Bentonite Seal | New 20' connection @ 1400. |
| 425 | | | | | Same as above (420 ft); coarser. | SP | Top of Filter Pack | |
| 430 | | | | | Same as above (420 ft); finer. | SP | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 435 | | | | | Well graded SAND (SW); pinkish gray (7.5YR 7/2); dry; loose; 100% very fine to coarse sand; no odor. | SW | | |
| 440 | | | | | Silty GRAVEL (GM); light brown (7.5YR 6/4); moist. | GM | Bottom of Screen | New 10' connection @ 1500. |
| | | | | | SILT with Sand (ML); light brown (7.5YR 6/4); moist; hard; 85% silt with clay; 15% sand; no odor. | ML | | |
| | | | | | Lean CLAY (CL); brown (7.5YR 5/6); dry; hard to stiff; medium plasticity; 90% clay; 10% sand; no odor. | CL | | |
| 445 | | | | | SILT with Sand (ML); light brown (7.5YR 6/4); moist; hard; 85% silt with clay; 15% sand; no odor. | ML | | |
| | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/4); dry; loose; 100% very fine sand; no odor. | SP | | |
| 450 | X | SB0341 | 0.0 | | | | | Blow counts (448.5-450'): 15/34/43. |

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# Borehole ID: KAFB-106131

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 3/2/2011
Date TD Reached: 3/5/2011
Date Completed: 3/7/2011

Ground Elevation AMSL (ft): 5344.4
Y Coordinate: 1472929.18
X Coordinate: 1541690.65

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Allen Willmore



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | Total depth = 450 ft. Reached @ 1515 on 3/5/11. |
| | | | | | | | | Water added during drilling (gallons) = 0 |
| 455 | | | | | | | | |
| | | | | | | | | Water added during construction (gallons) = 187.5 |
| 460 | | | | | | | | |
| 465 | | | | | | | | |
| 470 | | | | | | | | |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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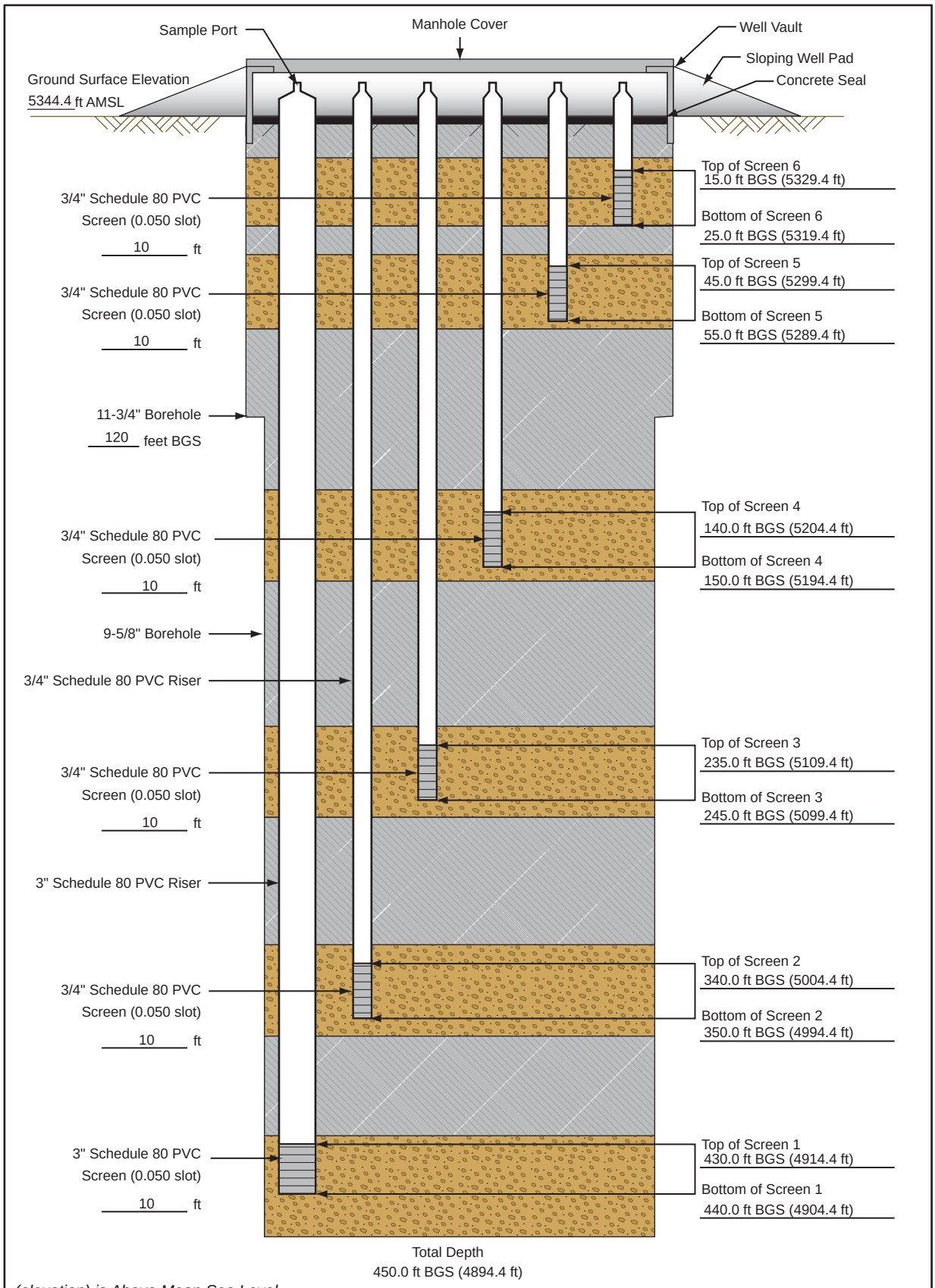
# Nested Soil Vapor Well Completion Diagram for KAFB-106131

Installation Start Date/Time: 3/6/2011 @ 07:40
Installation End Date/Time: 3/7/2011 @ 16:00



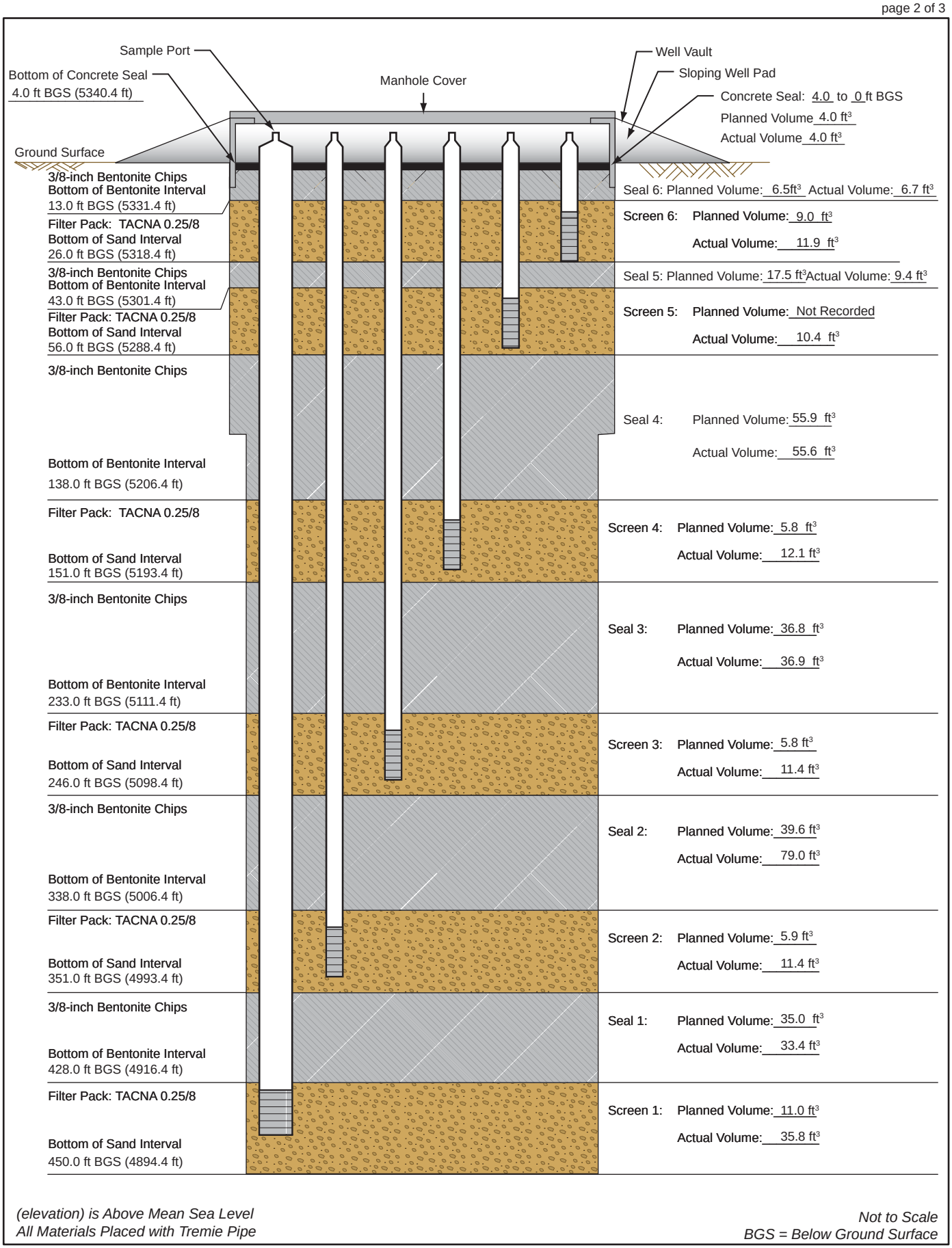



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106131






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

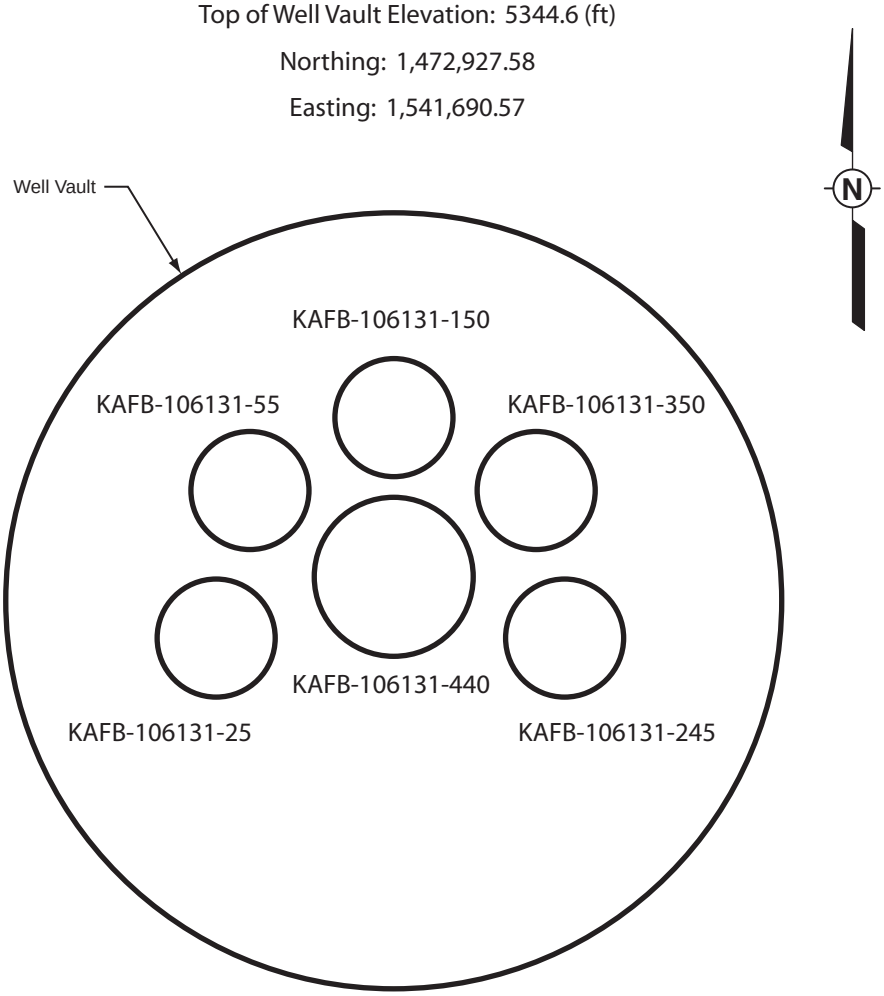
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106131



Top of Well Vault Elevation: 5344.6 (ft)

Northing: 1,472,927.58

Easting: 1,541,690.57




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106131-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1,472,926.92 | 1,541,690.40 | 5344.3 |
| KAFB-106131-55 | 3/4 | 55.0 | 45.0 - 55.0 | 1,472,926.74 | 1,541,690.62 | 5344.3 |
| KAFB-106131-150 | 3/4 | 150.0 | 140.0 - 150.0 | 1,472,927.23 | 1,541,690.52 | 5344.3 |
| KAFB-106131-245 | 3/4 | 245.0 | 235.0 - 245.0 | 1,472,926.90 | 1,541,690.89 | 5344.3 |
| KAFB-106131-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1,472,927.19 | 1,541,690.79 | 5344.3 |
| KAFB-106131-440 | 3 | 440.0 | 430.0 - 440.0 | 1,472,927.07 | 1,541,690.63 | 5344.3 |

# Borehole ID: KAFB-106132

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2011
Date TD Reached: 2/9/2011
Date Completed: 2/17/2011

Ground Elevation AMSL (ft): 5353.0
Y Coordinate: 1473593.29
X Coordinate: 1542804.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Sandy SILT (ML); light reddish brown (5YR 6/3); dry; stiff; nonplastic; 60% silt; 40% fine sand; subrounded; no odor. | | Concrete Seal | Hand augered. |
| 5 | | | | | Same as above (0 ft); brown (5YR 5/3); dry; trace coarse sand. | | Bentonite Seal | Began drilling @ 1550 on 2/6/11. |
| 10 | | SB0342 | 0.0 | | Same as above (0 ft); 70% silt; 30% fine sand; trace gravel. | | Top of Filter Pack | Drilling delayed @ 10 ft. Sampled for ~20 min. Blow counts (8.5-10'): 17/24. |
| 15 | | | | | SILT (ML); reddish brown (5YR 5/4); damp; stiff; low to nonplastic; 90% silt; 10% fine sand; trace coarse sand; no odor. | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 20 | | SB0343 | 0.0 | | SILT (ML); reddish brown (5YR 5/4); dry to damp; stiff; low plasticity; 95% silt; 5% fine sand; low dry strength; no odor. | | | Kelly down @ 1640. Blow counts (18.5-20'): 17/50. New connection @ 1641. Resumed drilling @ 0825 on 02/07/11. |
| 25 | | SB0344 | 0.0 | | Same as above (20 ft); reddish brown (2.5YR 4/4). | | Bottom of Screen | Blow counts (25.5-27'): 17/50. |
| | | SB0344 | | | | | Bentonite Seal | Blow counts (27-28.5'): 50/3. |
| 30 | | SB0344 | | | | | | Blow counts (28.5-30'): 50/5. |

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# Borehole ID: KAFB-106132

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2011
Date TD Reached: 2/9/2011
Date Completed: 2/17/2011

Ground Elevation AMSL (ft): 5353.0
Y Coordinate: 1473593.29
X Coordinate: 1542804.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); reddish brown (5YR 4/4); dry; stiff; low plasticity; 90% silt; 5% fine sand; 5% coarse sand; low dry strength; no odor. | | Bentonite Seal | Kelly down @ 0833. New connection @ 0930. Resumed drilling @ 0940. |
| 35 | | | | | Same as above (30 ft); 90% silt; 5% gravel; 5% coarse sand. | ML | | |
| | | SB0345 | 0.0 | | | | Top of Filter Pack | Kelly down @ 0945. Blow counts (37-38.5'): 12/23. |
| 40 | | | | | Sandy lean CLAY (CL); red (2.5YR 4/6); moist; hard (based on blow counts above); medium plasticity; 70% clay with minor silt; 30% very fine to fine sand; no odor. | CL | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | New connection @ 1007. Resumed drilling @ 1008. |
| 45 | | | | | SILT with Sand (ML); red (2.5YR 4/6); moist; medium stiff to stiff; 80% silt with minor clay; 20% very fine to medium sand; trace coarse sand; subrounded to subangular; no odor. | | | Kelly down @ 1015. |
| | | SB0346 | 0.0 | | | | | Blow counts (47-48.5'): 18/32. |
| 50 | | SB0346 | | | | | | Blow counts (48.5-50'): 17/28. |
| | | SB0347 | 0.0 | | Same as above (45 ft); no odor. | | Bottom of Screen | Blow counts (50-51.5'): 27/32. |
| | | | | | | ML | | New connection @ 1054. Resumed drilling @ 1058. |
| 55 | | | | | SILT (ML); red (2.5YR 4/6); moist; medium stiff to stiff; 95% silt with clay; 5% very fine to fine sand; trace medium to coarse sand; subrounded; no odor. | | Bentonite Seal | |
| 60 | | | | | | | | Kelly down @ 1103. |

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# Borehole ID: KAFB-106132

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2011
Date TD Reached: 2/9/2011
Date Completed: 2/17/2011

Ground Elevation AMSL (ft): 5353.0
Y Coordinate: 1473593.29
X Coordinate: 1542804.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT (ML); red (2.5YR 4/6); moist; medium stiff to stiff; 95% silt with clay; 5% very fine to fine sand; trace medium to coarse sand; subrounded to subangular; no odor. | | | New connection @ 1112. Resumed drilling @ 1113. |
| 65 | | | | | SILT (ML); red (2.5YR 5/6); dry to moist; medium stiff; 100% silt with trace clay; trace fine sand; no odor. | | | |
| 70 | | | | | Same as above (65 ft); no odor. | ML | | |
| 75 | | | | | SILT (ML); red (2.5YR 5/6); dry to moist; medium stiff; 95% silt with trace clay; 5% fine to coarse sand; angular to subangular; no odor. Note: predominately sharp, dark, lithic fragments. | | Bentonite Seal | Kelly down @ 1118. |
| 80 | | | | | Well graded SAND with Silt (SW-SM); light reddish brown (2.5YR 7/4); dry to moist; loose; 90% fine to coarse sand; subangular to subrounded; 10% silt; no odor. | SW-SM | | New connection @ 1140. Resumed drilling @1141. |
| 85 | | | | | SILT (ML); red (2.5YR 4/6); dry to moist; medium stiff to stiff; 85% silt; 15% clay; no odor. | ML | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106132

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2011
Date TD Reached: 2/9/2011
Date Completed: 2/17/2011

Ground Elevation AMSL (ft): 5353.0
Y Coordinate: 1473593.29
X Coordinate: 1542804.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); red (2.5YR 4/6); dry to moist; medium stiff to stiff; 85% silt; 15% clay; no odor. | | | |
| 95 | | | | | SILT (ML); red (2.5YR 5/6); dry to moist; medium stiff; 75% silt; 15% clay; 10% fine to coarse sand; subangular to subrounded; no odor. | | | |
| | | SB0348 | 0.0 | | | | | Kelly down @ 1146. Rate of penetration = 4ft/min. Blow counts (97-98.5'): 28/60. |
| 100 | | | | | Same as above (95 ft); no odor. | | | New connection @ 1217. Resumed drilling @ 1242. |
| 105 | | | | | SILT with Sand (ML); red (2.5YR 5/6); dry to moist; medium stiff; 75% silt with minor clay; 25% fine sand; trace medium to coarse sand; subangular; no odor. | ML | Bentonite Seal | |
| 110 | | | | | Same as above (105 ft); 85% silt with minor clay; 15% fine sand; trace medium to coarse sand; subangular; no odor. | | | |
| 115 | | | | | Sandy SILT (ML); light reddish brown (2.5YR 7/4); dry to moist; soft to medium stiff; 65% silt with trace clay; 35% very fine to coarse sand; subangular to subrounded; no odor. | | | Kelly down @ 1254. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106132

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2011
Date TD Reached: 2/9/2011
Date Completed: 2/17/2011

Ground Elevation AMSL (ft): 5353.0
Y Coordinate: 1473593.29
X Coordinate: 1542804.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT with Sand (ML); red (2.5YR 5/6); dry to moist; medium stiff to stiff; 80% silt with trace clay; 20% very fine to coarse sand; subangular to subrounded; no odor. | | | New connection @ 1304. Resumed drilling @ 1306. Kelly down @ 1309. TD of 11-3/4" casing at 120' bgs. |
| 125 | | | | | Sandy SILT (ML); red (2.5YR 5/6); dry; stiff; non to low plasticity; 65% silt; 25% coarse sand; angular; 10% gravel; subangular to subrounded; no odor. | | | New connection @ 0820 on 2/8/11. Resumed drilling @ 0827. |
| 130 | | | | | SILT (ML); brown (7.5YR 5/4); low plasticity; 95% silt; 5% fine sand; no odor. | ML | | |
| 135 | | | | | Same as above (130 ft). | | Bentonite Seal | Kelly down @ 0835. |
| 140 | | | | | SILT (ML); brown (7.5YR 4/4); dry; stiff; low plasticity; 90% silt; 10% clay; slight clay nodules; no odor. | | | New connection @ 0850. Resumed drilling @ 0900. |
| 145 | | | | | Lean CLAY (CL); brown (7.5YR 4/4); dry to damp; very stiff; medium to high plasticity; 100% clay; no odor. | CL | | |
| 150 | | SB0349 | 0.0 | | | | | Blow counts (148.5-150'): 30/50. |

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# Borehole ID: KAFB-106132

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2011
Date TD Reached: 2/9/2011
Date Completed: 2/17/2011

Ground Elevation AMSL (ft): 5353.0
Y Coordinate: 1473593.29
X Coordinate: 1542804.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Lean CLAY (CL); brown (7.5YR 4/4); dry to damp; very stiff; medium to high plasticity; 100% clay; no odor. | CL | | Kelly down @ 0912. New connection @ 0931. Resumed drilling @ 0935. Paused drilling to clear cyclone of fines @ 0937. |
| 155 | | | | | SILT (ML); brown (7.5YR 4/4); dry; stiff; low plasticity; 100% silt; trace coarse sand; rounded to subrounded; no odor. | ML | Bentonite Seal | Resumed drilling @ 1002. |
| 160 | | | | | Same as above (155 ft). | | Top of Filter Pack | Kelly down @ 1007. New connection @ 1015. Resumed drilling @ 1016. |
| 165 | | | | | SILT with Sand (ML); brown (7.5YR 4/4); dry; stiff; low plasticity; 75% silt; 25% fine sand; subangular; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Paused drilling @ 1027, drill string stuck. Resumed drilling @ 1121. |
| 170 | | | | | Well graded SAND (SW); light brownish gray (2.5Y 6/2); dry; loose; 60% fine sand; 30% medium sand; 10% coarse sand; subrounded; trace gravel; rounded; no odor. | SW | | |
| 175 | | | | | Same as above (170 ft); 50% fine sand; 30% medium sand; 20% coarse sand. | | Bottom of Screen | Kelly down @ 1124. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106132

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2011
Date TD Reached: 2/9/2011
Date Completed: 2/17/2011

Ground Elevation AMSL (ft): 5353.0
Y Coordinate: 1473593.29
X Coordinate: 1542804.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND with Gravel (SW); light olive brown (2.5Y 5/3); dry; loose; 40% fine sand; 20% medium sand; 20% coarse sand; 20% gravel; rounded; no odor. | | Filter Pack | New connection @ 1137. Resumed drilling @ 1138. |
| 185 | | | | | Same as above (180 ft). | SW | | |
| 190 | | | | | Poorly graded SAND (SP); dark grayish brown (2.5Y 4/2); dry; loose; 80% fine sand; 20% medium sand; trace coarse sand; rounded; no odor. | | | |
| 195 | | | | | Same as above (190 ft); trace fines. | SP | Bentonite Seal | |
| 200 | | SB0350 | 0.0 | | Same as above (190 ft). | | | Kelly down @ 1145. Blow counts (198.5-200'): 28/50. New connection @ 1207. Resumed drilling @ 1207. |
| 205 | | | | | Well graded SAND (SW); dark grayish brown (2.5Y 4/2); dry; dense; 40% fine sand; 30% medium sand; 30% coarse sand; trace gravel; rounded to subrounded; no odor. | SW | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106132

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2011
Date TD Reached: 2/9/2011
Date Completed: 2/17/2011

Ground Elevation AMSL (ft): 5353.0
Y Coordinate: 1473593.29
X Coordinate: 1542804.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded SAND (SP); grayish brown (2.5Y 5/2); dry; dense; 85% fine sand; 15% medium sand; subrounded; no odor. | SP | | |
| 215 | | | | | Well graded SAND (SW); dark grayish brown (2.5Y 4/2); dry; dense; 40% fine sand; 30% medium sand; 30% coarse sand; trace gravel; rounded to subrounded; no odor. | SW | | Kelly down @ 1214. |
| 220 | | | | | SILT (ML); olive brown (2.5Y 4/4); dry; stiff; nonplastic; 90% silt; 10% fine sand; no odor. | | Bentonite Seal | New connection @ 1227. Resumed drilling @1228. |
| 225 | | | | | SILT with Sand (ML); olive brown (2.5Y 4/4); dry; stiff; nonplastic; 75% silt; 25% fine sand; no odor. | ML | | |
| 230 | | | | | Well graded SAND (SW); light olive brown (2.5Y 5/3); dry; dense; 60% fine sand; 20% medium sand; 20% coarse sand; subrounded to subangular; no odor. | | | |
| 235 | | | | | Well graded SAND with Gravel (SW); light olive brown (2.5Y 5/3); dry; dense; 35% fine sand; 20% medium sand; 20% coarse sand; rounded; 25% gravel; rounded; no odor. | SW | Top of Filter Pack | Kelly down @ 1240. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106132

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2011
Date TD Reached: 2/9/2011
Date Completed: 2/17/2011

Ground Elevation AMSL (ft): 5353.0
Y Coordinate: 1473593.29
X Coordinate: 1542804.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND (SP); light olive brown (2.5Y 5/3); dry; dense; 80% fine sand; 15% medium sand; rounded; 5% gravel; rounded; no odor. | SP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | New connection @ 1324. Resumed drilling @ 1325. |
| 245 | | | | | Well graded SAND (SW); grayish brown (2.5Y 5/2); dry; dense; 55% fine sand; 30% medium sand; 15% coarse sand; subrounded to subangular; trace gravel; no odor. | SW | | |
| 250 | | SB0351 | 0.1 | | Same as above (245 ft); 20% fine sand; 40% medium sand; 40% coarse sand; trace gravel; trace clay nodules. | | Bottom of Screen | Kelly down @ 1331. Blow counts (248.5-250'): 37/50. New connection @ 1353. Resumed drilling @ 1354. |
| 255 | | | | | Poorly graded SAND (SP); olive brown (2.5Y 4/3); dry; dense; 70% fine sand; 30% medium sand; angular to subangular; no odor. | SP | | Kelly down @ 1357. |
| 260 | | | | | Same as above (255 ft); trace gravel. | | Bentonite Seal | New connection @ 1404. Resumed drilling @ 1404. |
| 265 | | | | | Same as above (255 ft); mica flakes to 3mm. | | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106132

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2011
Date TD Reached: 2/9/2011
Date Completed: 2/17/2011

Ground Elevation AMSL (ft): 5353.0
Y Coordinate: 1473593.29
X Coordinate: 1542804.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Silty SAND (SM); olive brown (2.5Y 4/3); dry; dense; 45% fine sand; 15% medium sand; 10% coarse sand; rounded to subrounded; 30% silt and clay nodules; no odor. | SM | | |
| 275 | | | | | Poorly graded SAND (SP); light olive brown (2.5Y 5/3); dry; dense; 80% fine sand; 10% medium sand; 10% coarse sand; rounded; no odor. | | | Kelly down @ 1415. |
| 280 | | | | | Same as above (275 ft). | SP | | New connection @ 1435. Resumed drilling @ 1436. |
| 285 | | | | | Well graded SAND (SW); olive brown (2.5Y 4/4); dry; dense; 55% fine sand; 30% medium sand; 15% coarse sand; rounded; no odor. | SW | Bentonite Seal | |
| 290 | | | | | Poorly graded SAND (SP); light olive brown (2.5Y 5/4); dry; dense; 70% fine sand; 30% medium sand; trace coarse sand; subrounded to subangular; no odor. | | | |
| 295 | | | | | Same as above (290 ft). | SP | | Kelly down @ 1446. |
| 300 | | SB0352 | 0.4 | | | | | Blow counts (298.5-300'): 27/50. |

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# Borehole ID: KAFB-106132

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2011
Date TD Reached: 2/9/2011
Date Completed: 2/17/2011

Ground Elevation AMSL (ft): 5353.0
Y Coordinate: 1473593.29
X Coordinate: 1542804.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded SAND (SW); olive brown (2.5Y 4/4); dry; dense; 35% coarse sand; 35% medium sand; 30% fine sand; trace gravel; trace clay nodules; no odor. | SW | | New connection @ 1510. Resumed drilling @ 1514. |
| 305 | | | | | Lean CLAY (CL); olive brown (2.5Y 4/4); dry to moist; stiff; medium to high plasticity; 100% clay; no odor. | CL | | |
| 310 | | | | | Well graded SAND (SW); light olive brown (2.5Y 5/3); 65% fine sand; 20% medium sand; 10% coarse sand; subangular; 5% clay nodules; no odor. | | | |
| 315 | | | | | Same as above (310 ft); 65% fine sand; 20% medium sand; 15% coarse sand; subangular; trace gravel; subrounded; no clay nodules. | | Bentonite Seal | Kelly down @ 1531. |
| 320 | | | | | Same as above (310 ft). | SW | | New connection @ 1541. Resumed drilling @ 1542. |
| 325 | | | | | Well graded SAND (SW); grayish brown (2.5Y 5/2); dry; dense; 65% fine sand; 20% medium sand; 10% coarse sand; subrounded; 5% gravel to 3cm; well rounded; no odor. | | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106132

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2011
Date TD Reached: 2/9/2011
Date Completed: 2/17/2011

Ground Elevation AMSL (ft): 5353.0
Y Coordinate: 1473593.29
X Coordinate: 1542804.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Poorly graded SAND (SP); olive brown (2.5Y 4/3); dry; dense; 100% fine sand; rounded; trace gravel; no odor. | SP | Bentonite Seal | |
| 335 | | | | | Well graded SAND (SW); olive brown (2.5Y 4/3); dry; dense; 50% fine sand; 20% medium sand; 20% coarse sand; 10% gravel; well rounded; no odor. | SW | Top of Filter Pack | Kelly down @ 1551. |
| 340 | | | | | Well graded SAND with Gravel (SW); olive brown (2.5Y 4/3); dry; dense; 35% fine sand; 15% medium sand; 15% coarse sand; subrounded; 35% gravel; rounded; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | New connection @ 1600. Resumed drilling @ 1601. |
| 345 | | | | | Poorly graded GRAVEL with Sand (GP); olive brown (2.5Y 4/3); dry; dense; 70% gravel to 2cm; rounded; 30% fine to coarse sand; rounded; no odor. | GP | | |
| 350 | X | SB0353 | 0.0 | | | | Bottom of Screen | Kelly down @ 1606. Blow count (348.5-350'): 7/28. New connection @ 1634. Resumed drilling @ 1635. |
| 355 | | | | | Well graded SAND with Gravel (SW); olive brown (2.5Y 4/3); dry; dense; 40% fine sand; 30% medium sand; 15% coarse sand; subrounded; 15% gravel; no odor. | SW | Bentonite Seal | |
| 360 | | | | | Poorly graded SAND (SP); olive brown (2.5Y 4/3); dry; dense; 100% fine sand; rounded; no odor. | SP | | |

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# Borehole ID: KAFB-106132

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2011
Date TD Reached: 2/9/2011
Date Completed: 2/17/2011

Ground Elevation AMSL (ft): 5353.0
Y Coordinate: 1473593.29
X Coordinate: 1542804.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Poorly graded SAND (SP); olive brown (2.5Y 4/3); dry; dense; 100% fine sand; rounded; no odor. | | | Kelly down @ 1641. New connection @ 1650. Resumed drilling @ 0750 on 2/9/11. |
| 365 | | | | | Same as above (360 ft); 70% fine sand; 30% medium sand; rounded. | | | |
| 370 | | | | | Same as above (360 ft). | SP | Bentonite Seal | |
| 375 | | | | | Same as above (360 ft). | | | |
| 380 | | | | | | | | Kelly down @ 0805. |
| | | | | | Well graded SAND (SW); olive brown (2.5Y 4/3); dry; dense; 55% fine sand; 25% medium sand; 20% coarse sand; rounded; trace gravel; rounded; trace fines; no odor. | | | New connection @ 0817. Resumed drilling @ 0818. |
| 385 | | | | | Well graded SAND with Gravel (SW); olive brown (2.5Y 4/3); dry; dense; 30% fine sand; 30% medium sand; 20% coarse sand; rounded; 20% gravel; rounded; no odor. | SW | Native Backfill | |
| 390 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/25/11 17:12 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106132

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2011
Date TD Reached: 2/9/2011
Date Completed: 2/17/2011

Ground Elevation AMSL (ft): 5353.0
Y Coordinate: 1473593.29
X Coordinate: 1542804.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); olive brown (2.5Y 4/3); dry; dense; 60% fine sand; 30% medium sand; 10% coarse sand; subrounded; no odor. | | | |
| 395 | | | | | Same as above (390 ft); 30% fine sand; 35% medium sand; 35% coarse sand. | | Native Backfill | |
| 400 | | SB0354 | 0.1 | | Same as above (390 ft); 30% fine sand; 30% medium sand; 30% coarse sand; rounded; 10% gravel to 1.5cm; rounded. | | | Kelly down @ 0834. Blow counts (398.5-400'): 12/28. New connection @ 1005. Resumed drilling @ 1009. |
| 405 | | | | | Well graded SAND with Gravel (SW); olive brown (2.5Y 4/3); dry; dense; 55% fine sand; 20% medium sand; 10% coarse sand; rounded; 15% gravel; rounded; no odor. | SW | | |
| 410 | | | | | Same as above (405 ft); 50% fine sand; 15% coarse sand. | | Bentonite Seal | |
| 415 | | | | | Same as above (405 ft); 35% fine sand; 20% medium sand; 20% coarse sand; 25% gravel. | | | |
| 420 | | | | | | | | Kelly down @ 1022. |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/25/11 17:12 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106132

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2011
Date TD Reached: 2/9/2011
Date Completed: 2/17/2011

Ground Elevation AMSL (ft): 5353.0
Y Coordinate: 1473593.29
X Coordinate: 1542804.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND (SP); light yellowish brown (2.5Y 6/4); dry; dense; 100% fine sand; rounded; trace fines; no odor. | | | New connection @ 1029. Resumed drilling @ 1030. |
| 425 | | | | | Same as above (420 ft); 85% fine sand; 10% medium sand; rounded; 5% gravel; rounded; clay nodules to 1cm. | | Bentonite Seal | |
| 430 | | | | | Same as above (420 ft); 95% fine sand; 5% fines; trace mica flakes to 2mm. | SP | | |
| 435 | | | | | Same as above (420 ft); trace gravel. | | | |
| 440 | | | | | | | Top of Filter Pack | Kelly down @ 1105. |
| | | | | | Well graded SAND (SW); light olive brown (2.5Y 5/3); dry; dense; 50% fine sand; 25% medium sand; 25% coarse sand; rounded to subrounded; trace clay nodules; no odor. | SW | Top of 3" Schedule 80 PVC 0.050 Slot Screen | New connection @ 1200. Resumed drilling @ 1204. |
| 445 | | | | | Poorly graded SAND (SP); olive brown (2.5Y 4/3); dry; dense; 75% fine sand; 25% medium sand; rounded; no odor. | SP | | Kelly down @ 1215. |
| 450 | X | SB0355 | 2.0 | | | | | Blow counts (448.5-450'): 7/50. |

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# Borehole ID: KAFB-106132

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2011
Date TD Reached: 2/9/2011
Date Completed: 2/17/2011

Ground Elevation AMSL (ft): 5353.0
Y Coordinate: 1473593.29
X Coordinate: 1542804.16

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock

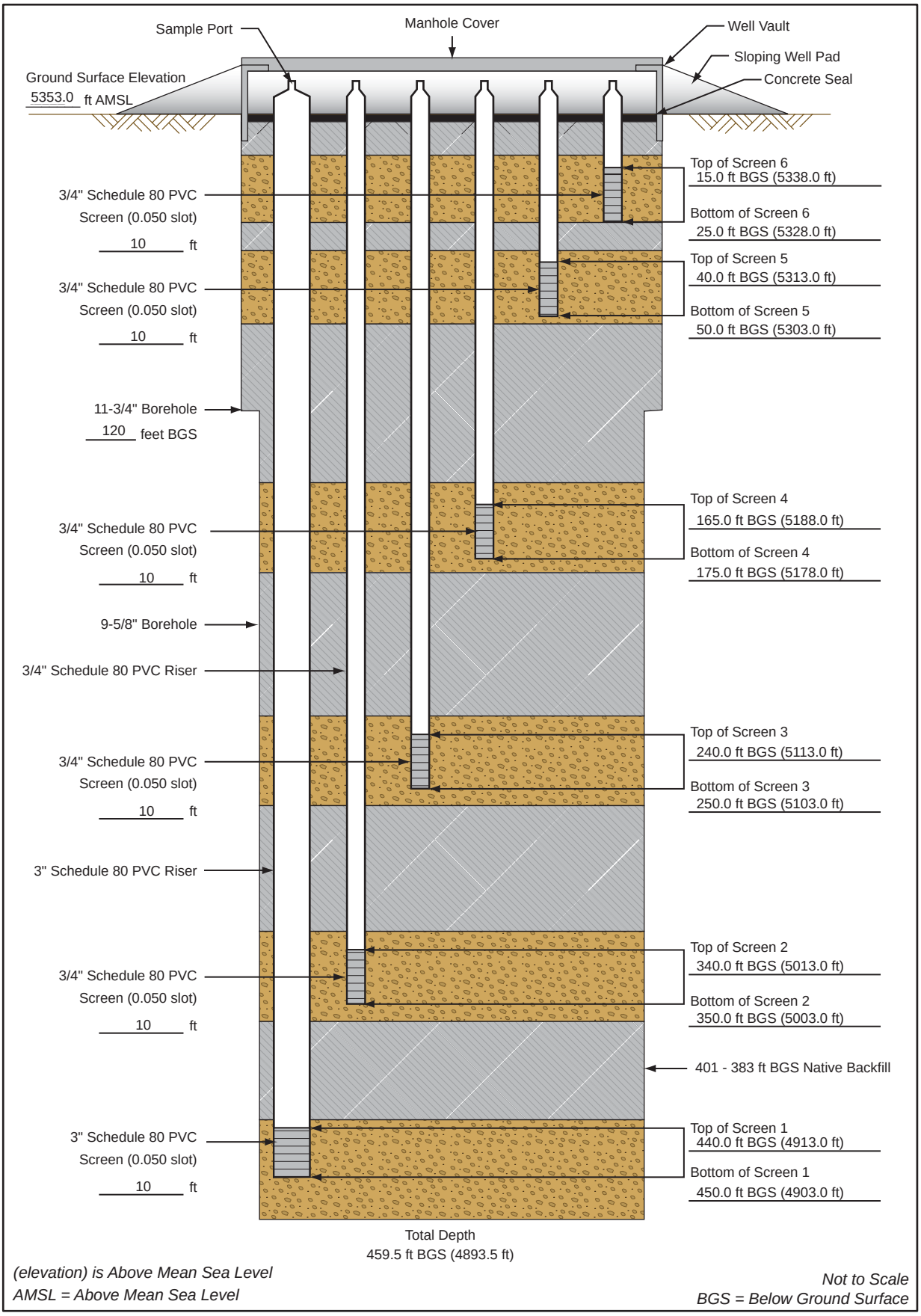


| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | |
| 455 | | | | | Poorly graded SAND (SP); olive brown (2.5Y 4/3); dry; dense; 75% fine sand; 25% medium sand; rounded; no odor. | SP | Bottom of Screen | |
| 460 | | | | | | | | Total Depth = 459.5 ft. Reached @ 1545 on 2/9/11.<br>Water added during drilling (gallons) = 0 |
| 465 | | | | | | | | Water added during construction (gallons) = Not Recorded |
| 470 | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

# Nested Soil Vapor Well Completion Diagram for KAFB-106132

Installation Start Date/Time: 2/10/2011 @ 07:40
Installation End Date/Time: 2/17/2011 @ 08:25



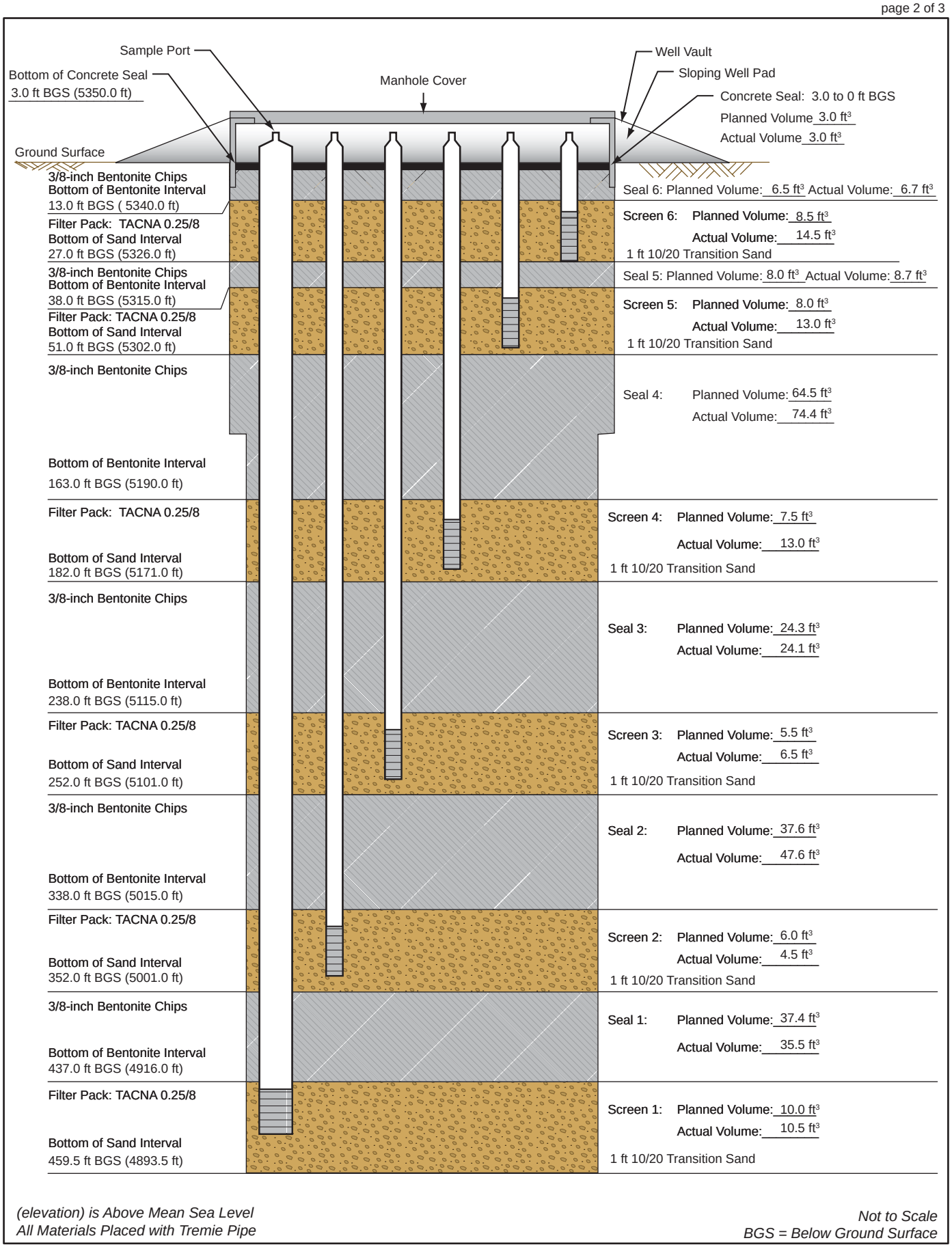



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106132






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

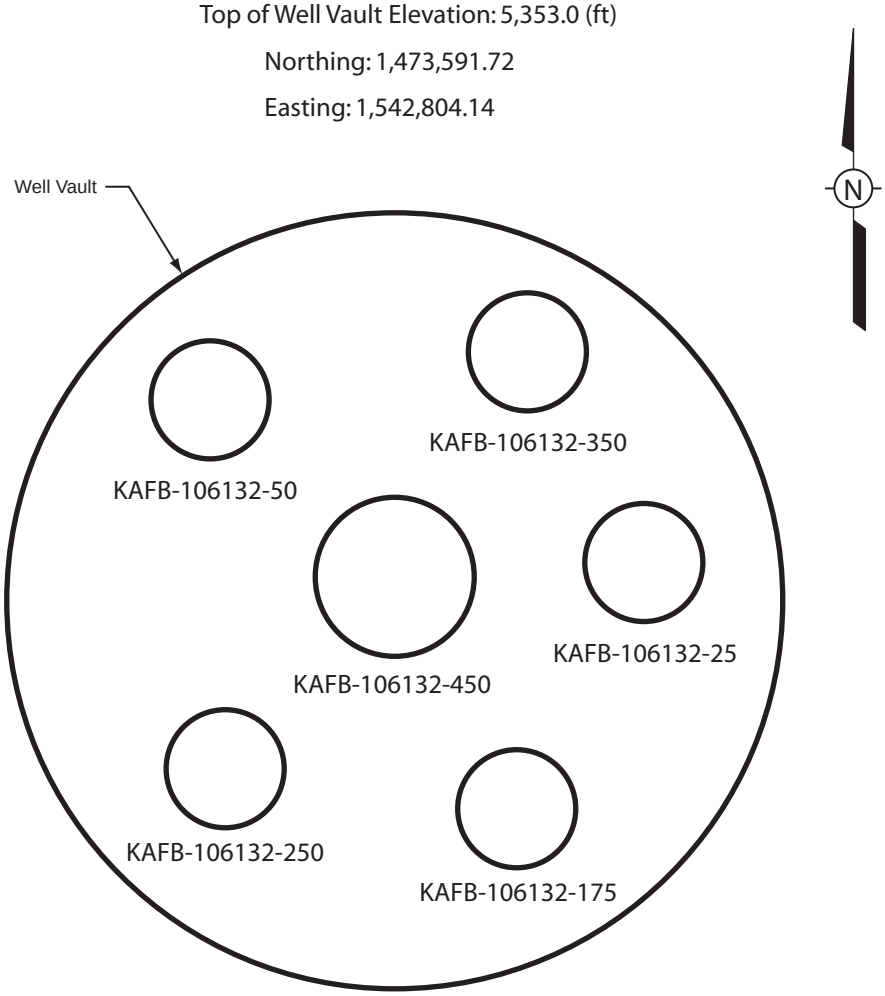
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106132



Top of Well Vault Elevation: 5,353.0 (ft)

Northing: 1,473,591.72

Easting: 1,542,804.14




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106132-25 | 3/4 | 25.0 | 15.0-25.0 | 1,473,591.31 | 1,542,804.30 | 5352.7 |
| KAFB-106132-50 | 3/4 | 50.0 | 40.0-50.0 | 1,473,591.40 | 1,542,803.81 | 5352.7 |
| KAFB-106132-175 | 3/4 | 175.0 | 165.0-175.0 | 1,473,591.06 | 1,542,804.13 | 5352.7 |
| KAFB-106132-250 | 3/4 | 250.0 | 240.0-250.0 | 1,473,591.09 | 1,542,803.82 | 5352.7 |
| KAFB-106132-350 | 3/4 | 350.0 | 340.0-350.0 | 1,473,591.52 | 1,542,804.08 | 5352.7 |
| KAFB-106132-450 | 3 | 450.0 | 440.0-450.0 | 1,473,591.35 | 1,542,804.04 | 5352.7 |

# Borehole ID: KAFB-106133

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/7/2011
Date TD Reached: 2/10/2011
Date Completed: 2/16/2011

Ground Elevation AMSL (ft): 5352.0
Y Coordinate: 1473504.01
X Coordinate: 1542416.28

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Sandy SILT (ML); brown (7.5YR 4/4); dry; very soft; nonplastic; 50% silt; 40% medium sand; 10% fine gravel to 5mm. | | Concrete Seal | Hand augered. |
| 5 | | | | | Same as above (0 ft); light brown (7.5YR 6/3). | ML | | Began drilling @ 1021 on 2/7/11. Sediments stuck in hose. Resumed drilling @ 1030. Sand line spool jumped @ 1050, needs repair. Resumed operations @ 1310. |
| 10 | | SB0356 | 0.4 | | | | Bentonite Seal | Resumed drilling @ 1330. Kelly down @ 1335. Blow counts (8.5-10'): Not Recorded. Blow counts (10-11.5'): 32/50. |
| 15 | | SB0356 | | | Silty SAND (SM); brown (7.5YR 4/3); dry; very dense; 60% fine sand; 15% coarse sand to 3mm; subrounded; 25% silt. | SM | Top of Filter Pack | |
| 20 | | SB0357 | 0.1 | | Sandy SILT (ML); brown (7.5YR 5/4); moist; hard; 55% silt; 40% very fine sand; 5% gravel to 1.5cm; trace clay nodules. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Blow counts (18.5-20'): 27/50. |
| | | SB0357 | | | Same as above (15 ft); hard. | ML | | Blow counts (20-21.5'): 27/50. 10' drill string won't fit through hammer @ 1357, need new one. Resumed drilling @ 1414. |
| 25 | | | | | Sandy SILT (ML); reddish brown (5YR 4/4); moist; hard; 60% silt; 10% clay nodules; 30% fine sand; trace fine gravel to 1cm. | | Bottom of Screen | |
| 30 | | SB0358 | 0.6 | | | | Bentonite Seal | Blow counts (28-29.5'): 25/50. Blow counts (29.5-31'): Not Recorded. |

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# Borehole ID: KAFB-106133

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/7/2011
Date TD Reached: 2/10/2011
Date Completed: 2/16/2011

Ground Elevation AMSL (ft): 5352.0
Y Coordinate: 1473504.01
X Coordinate: 1542416.28

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | SB0358 | | | SILT with Sand (ML); reddish brown (5YR 5/4); dry; hard; low plasticity; 60% silt; 20% clay; 15% very fine sand; 5% fine gravel to 1.2 cm. | ML | | Blow counts (31-32.5'): Not Recorded. |
| | | SB0358 | | | | | | |
| 35 | | | | | Lean Clay (CL); brown (7.5YR 4/4); moist; hard; medium plasticity; 60% clay; 40% silt. | CL | Bentonite Seal | |
| 40 | | SB0359 | 0.0 | | SILT (ML); brown (7.5YR 4/4); moist; hard; 70% silt; 20% clay; 10% very fine sand to 0.08mm. | ML | Top of Filter Pack<br>Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Blow counts (38.5-40'): 27/50. |
| 45 | | | | | SILT with Sand (ML); brown (7.5YR 4/4); moist; hard; 60% silt; 20% clay; 10% very fine sand; 10% fine gravel to 1cm. | | | |
| | | SB0360, SB0360-MS | 0.0 | | | | | Blow counts (47-48.5'): 30/36. |
| 50 | | SB0360-MSD | 0.0 | | | | Bottom of Screen | Blow counts (48.5-50'): 22/40. |
| | | | | | Same as above (45 ft). | | | String too large diameter @ 1545. Kelly down @ 1557. |
| 55 | | | | | Sandy SILT with Gravel (ML); brown (7.5YR 4/4); moist; soft; low plasticity; 60% silt with trace clay; 25% fine to coarse sand; 15% fine gravel to 1.2cm. | | | |
| 60 | | | | | Lean CLAY (CL); brown (7.5YR 4/4); moist; soft; medium plasticity; 60% clay; 30% silt; 10% fine to very coarse sand to 4mm. | CL | Bentonite Seal | |

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# Borehole ID: KAFB-106133

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/7/2011
Date TD Reached: 2/10/2011
Date Completed: 2/16/2011

Ground Elevation AMSL (ft): 5352.0
Y Coordinate: 1473504.01
X Coordinate: 1542416.28

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Lean CLAY with Sand (CL); brown (7.5YR 4/4); moist; soft; medium plasticity; 50% clay; 30% silt; 20% fine to very coarse sand. | CL | | |
| 65 | | | | | Sandy SILT (ML); brown (7.5YR 4/3); dry; soft; low plasticity; 60% silt; 40% fine to coarse sand to 4mm. | | | |
| 70 | | | | | Same as above (65 ft); trace fine gravel to 1cm. | ML | | |
| 75 | | | | | SILT with SAND (ML); brown (7.5YR 5/4); dry; soft; low plasticity; 80% silt; 20% very fine sand; trace fine gravel to 1.5cm. | | Bentonite Seal | |
| 80 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; very loose; 100% very fine sand to 0.1mm; rounded. | SP | | |
| 85 | | | | | Silty SAND (SM); brown (7.5YR 5/4); dry; very loose; 60% fine to coarse sand to 4mm; rounded; 40% silt. | SM | | |
| 90 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; firm; 80% silt; 5% clay; 15% very fine sand to 0.08mm. | ML | | |

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# Borehole ID: KAFB-106133

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/7/2011
Date TD Reached: 2/10/2011
Date Completed: 2/16/2011

Ground Elevation AMSL (ft): 5352.0
Y Coordinate: 1473504.01
X Coordinate: 1542416.28

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; firm; 80% silt; 5% clay; 15% very fine sand to 0.08mm. | | | |
| 95 | | | | | Same as above (90 ft). | ML | | Kelly down @ 1645. |
| 100 | | SB0361 | 0.0 | | | | | Blow counts (98.5-100'): 50/50. End of 2/7/11. |
| | | SB0361 | | | Same as above (90 ft); hard. | | | Began sampling at 100' @ 0837 on 2/8/11. Blow counts (100-101.5'): 50/50. |
| 105 | | | | | Lean CLAY (CL), brown (7.5YR 5/4); moist; hard; medium plasticity; 70% clay; 30% silt; trace gravel to 7mm. | CL | Bentonite Seal | New connection @ 0844. Resumed drilling @ 0846. Cuttings stuck in cyclone hose. Unstuck @ 0851. |
| 110 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; very loose; 100% fine sand; trace coarse sand to 2mm; subrounded. | SP | | |
| 115 | | | | | Lean CLAY (CL); brown (10YR 4/3); moist; hard; medium plasticity; 70% clay; 30% silt. | CL | | |
| 120 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; very loose; 60% coarse sand to 2mm; subangular; 40% medium sand. | SP | | Kelly down @ 0907 |

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# Borehole ID: KAFB-106133

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/7/2011
Date TD Reached: 2/10/2011
Date Completed: 2/16/2011

Ground Elevation AMSL (ft): 5352.0
Y Coordinate: 1473504.01
X Coordinate: 1542416.28

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Sandy SILT (ML); brown (7.5YR 4/4); moist; very soft; low plasticity; 70% silt; trace clay nodules; 30% fine sand to 0.5mm. | | | TD with 11 3/4" casing @ 0907. |
| 125 | | | | | SILT (ML); brown (7.5YR 5/4); moist; soft; medium plasticity; 60% silt; 40% clay. | ML | | New connection @ 1619. Resumed drilling @ 1620. |
| 130 | | | | | Sandy SILT (ML); brown (10YR 5/3); moist; very soft; low plasticity; 70% silt; 30% very fine to medium sand to 1mm. | | | |
| 135 | | | | | Lean CLAY (CL); yellowish brown (10YR 5/4); moist; firm; medium plasticity; 60% clay; 30% silt; 10% very fine sand to 0.08mm. | CL | Bentonite Seal | |
| 140 | | | | | SILT (ML); yellowish brown (10YR 5/4); moist; firm; low plasticity; 70% silt; 20% clay; 10% fine sand to 0.5mm. | ML | | Kelly down @ 1629. New 10' connection @ 1639. Resumed drilling @ 1640. Kelly down @ 1650. End of 2/8/11. |
| 145 | | | | | Lean CLAY (CL); yellowish brown (10YR 5/4); moist; firm; low plasticity; 60% clay; 40% silt; trace fine sand to 0.2mm. | CL | | Began sampling @ 0802 on 2/9/11. Sampler line too slow, poor recovery. |
| 150 | X | SB0362 | 0.0 | | | | | Blow counts (148.5-150'): 50/50. Blow counts |

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# Borehole ID: KAFB-106133

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/7/2011
Date TD Reached: 2/10/2011
Date Completed: 2/16/2011

Ground Elevation AMSL (ft): 5352.0
Y Coordinate: 1473504.01
X Coordinate: 1542416.28

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | | | | |
| | | SB0362 | | | Lean CLAY (CL); yellowish brown (10YR 5/4); moist; hard; low plasticity; 60% clay; 40% silt; trace fine sand to 0.2mm. | CL | Bentonite Seal | (150-151.5'): 50/50. New 10' connection @ 0825. Resumed drilling @ 0826. |
| 155 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); moist; soft; nonplastic; 80% silt; 5% clay; 15% very fine sand to 0.08mm. | | Top of Filter Pack | Cuttings stuck in cyclone @ 0834. Cuttings unstuck @ 0843. Resumed drilling. |
| 160 | | | | | SILT (ML); brown (7.5YR 5/4); moist; firm; low plasticity; 80% silt; 20% clay. | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 0855. New 20' connection @ 0905. Resumed drilling @ 0906. |
| 165 | | | | | Same as above (160ft); trace fine sand to 0.5mm. | | | Hose plugged @ 0915. Resumed drilling @ 1047. |
| 170 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); moist; very loose; 80% fine sand; 20% medium sand to 1mm; subangular. | SP | | |
| 175 | | | | | Well graded SAND with Silt (SW-SM); dark yellowish brown (10YR 4/4); moist, very loose; 90% fine to coarse sand to 4mm; rounded; 10% silt. | SW-SM | Bottom of Screen | |
| 180 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; very loose; 100% very fine to coarse sand to 5mm; rounded. | SW | Bentonite Seal | |

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# Borehole ID: KAFB-106133

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/7/2011
Date TD Reached: 2/10/2011
Date Completed: 2/16/2011

Ground Elevation AMSL (ft): 5352.0
Y Coordinate: 1473504.01
X Coordinate: 1542416.28

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; very loose; 100% very fine to coarse sand to 5mm; rounded; trace fine gravel to 1cm. | SW | | Kelly down @ 1100. Resumed drilling @ 1109. |
| 185 | | | | | Same as above (180 ft); trace fine gravel to 1.8cm. | | | |
| 190 | | | | | Same as above (180 ft). | | | |
| 195 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; very loose; 100% fine sand; trace fine gravel to 1cm; trace fines. | SP | Bentonite Seal | |
| 200 | | SB0363 | 0.0 | | Same as above (195 ft); very dense; 100% medium sand. | | | Kelly down @ 1118. Blow counts (198.5-200'): 27/50. Resumed drilling @ 1145. |
| 205 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; very dense; 100% fine to very coarse sand; trace fine gravel to 1cm; subrounded; trace clay nodules. | SW | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106133

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/7/2011
Date TD Reached: 2/10/2011
Date Completed: 2/16/2011

Ground Elevation AMSL (ft): 5352.0
Y Coordinate: 1473504.01
X Coordinate: 1542416.28

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); moist; very loose; 95% medium sand; 5% coarse sand to 4mm; rounded. | | | |
| 215 | | | | | Same as above (210 ft); 100% fine sand to 0.2mm. | SP | | |
| 220 | | | | | Well graded SAND with Silt (SW-SM); brown (10YR 5/3); moist; loose; 80% fine to very coarse sand; 10% fine gravel to 1.5cm; rounded; 10% silt with clay nodules. | SW-SM | | Kelly down @ 1154. New connection @ 1205. Resumed drilling @ 1205. |
| 225 | | | | | Same as above (220 ft). | | Bentonite Seal | |
| | | | | | GRAVEL (GP); lense; gravel to 1.5 cm. | GP | | |
| | | | | | Lean CLAY (CL); lense. | CL | | |
| 230 | | | | | Well graded SAND with Silt (SW-SM); brown (10YR 5/3); moist; loose; 90% fine to very coarse sand; trace gravel to 1.9cm; rounded; 10% silt with clay. | SW-SM | | |
| 235 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; very loose; 100% very fine to coarse sand; trace fine gravel to 1.7cm; subrounded. | SW | Top of Filter Pack | |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106133

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/7/2011
Date TD Reached: 2/10/2011
Date Completed: 2/16/2011

Ground Elevation AMSL (ft): 5352.0
Y Coordinate: 1473504.01
X Coordinate: 1542416.28

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; very loose; 100% very fine to coarse sand; trace fine gravel to 1.7cm; subrounded. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1214. New 10' connection @ 1221. Resumed drilling @ 1223. |
| 245 | | | | | Same as above (240 ft). | SW | | |
| 250 | | SB0364 | 0.0 | | | SW | | Kelly down @ 1228. Blow counts (248.5-250'): 47/50. |
| | | SB0364 | | | Same as above (240 ft); damp; very dense; 10% fine gravel to 3cm. | SW | Bottom of Screen | Blow counts (250-251.5'): 50. Resumed drilling @ 1308. |
| 255 | | | | | Same as above (240 ft); damp; very dense; 10% fine gravel to 3cm. | SW | | |
| 260 | | | | | Same as above (240 ft); damp; very dense; 10% fine gravel to 3cm. | SW | Bentonite Seal | Kelly down @ 1310. New 20' connection @ 1318. Resumed drilling @ 1318. |
| | | | | | Lean CLAY (CL); light brown (7.5YR 6/3); moist; firm; low plasticity; 60% clay; 40% silt. | CL | | |
| 265 | | | | | Same as above (262 ft); brown (10YR 5/3). | CL | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106133

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/7/2011
Date TD Reached: 2/10/2011
Date Completed: 2/16/2011

Ground Elevation AMSL (ft): 5352.0
Y Coordinate: 1473504.01
X Coordinate: 1542416.28

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Lean CLAY (CL); light brown (7.5YR 6/3); moist; firm; low plasticity; 60% clay; 40% silt. | CL | | |
| 275 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); moist; very loose; 100% fine to medium sand to 0.5mm; subrounded; trace fines. | SP | | |
| 280 | | | | | Same as above (275 ft); slightly finer. | | | Kelly down @ 1329. Resumed drilling @ 1338. |
| 285 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; very loose; 100% very fine to coarse sand to 4.8mm; rounded. | SW | Bentonite Seal | |
| 290 | | | | | Same as above (285 ft). | | | |
| 295 | | | | | SILT (ML); brown (7.5YR 4/3); moist; hard; low plasticity; 70% silt; 20% clay; 10% very fine sand to 0.08mm. | ML | | |
| | | | | | Same as above (292 ft); 60% silt; 30% clay; 10% very fine sand. | | | |
| 300 | | SB0365 | 0.0 | | | | | Kelly down @ 1346. Blow counts (298-299.5'): 12/24. |

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# Borehole ID: KAFB-106133

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/7/2011
Date TD Reached: 2/10/2011
Date Completed: 2/16/2011

Ground Elevation AMSL (ft): 5352.0
Y Coordinate: 1473504.01
X Coordinate: 1542416.28

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | SB0365 | | | Silty SAND (SM); brown (7.5YR 5/3); moist; dense; 85% fine to medium sand to 0.5mm; subrounded; 15% silt. | SM | | Blow counts (299.5-301'): Not Recorded. Resumed drilling. |
| 305 | | | | | Same as above (300 ft). | | | |
| 310 | | | | | Well graded SAND (SW); brown (10YR 4/3); moist; loose; 95% very fine to very coarse sand; 5% fine gravel to 7mm; subangular. | SW | | |
| | | | | | Same as above (307 ft); no gravel. | | | |
| 315 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); moist; very loose; 85% fine to very coarse sand; 15% fine gravel to 3.5cm; well rounded. | | Bentonite Seal | |
| 320 | | | | | Same as above (315 ft); 80% fine to very coarse sand; 20% fine gravel to 1.3cm. | | | Kelly down @ 1430. Resumed drilling @ 1438. |
| 325 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; very loose; 90% fine to very coarse sand; 5% fine gravel to 1cm; rounded; 5% silt. | | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106133

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/7/2011
Date TD Reached: 2/10/2011
Date Completed: 2/16/2011

Ground Elevation AMSL (ft): 5352.0
Y Coordinate: 1473504.01
X Coordinate: 1542416.28

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); dry; very loose; 85% fine to very coarse sand; 15% fine gravel to 2.1cm; rounded. | SW | | |
| | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; very loose; 100% fine sand to 0.02mm; subrounded; trace fines. | SP | Bentonite Seal | |
| 335 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; very loose; 95% very fine to very coarse sand; 5% fine gravel to 8mm; rounded. | | | |
| | | | | | | | Top of Filter Pack<br>Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 340 | | | | | Same as above (335 ft); trace gravel. | | | Kelly down @ 1445. Resumed drilling @ 1454. |
| | | | | | | SW | | |
| 345 | | | | | Same as above (335 ft); no gravel. | | | Drill bit is packed off @ 1500. Unstuck @ 1504. |
| 350 | | SB0366 | 0.1 | | | | Bottom of Screen | Blow counts (348.5-350'): 19/27. |
| | | | | | Same as above (335 ft); dense; no gravel. | | | Kelly down @ 1507. Rig down to lengthen sand line. Completed sand line attachment @ 1550 and sampled at 350'. Compressor would not start @ 1620. End of 2/9/11. Resumed drilling @ 0824 on 2/10/11. |
| | | | | | Silty SAND (SM); brown (7.5YR 5/4); dry; dense; 85% very fine to fine sand to 0.1mm; rounded; 15% silt; low plasticity. | | | |
| 355 | | | | | Same as above (352 ft). | SM | Bentonite Seal | |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106133

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/7/2011
Date TD Reached: 2/10/2011
Date Completed: 2/16/2011

Ground Elevation AMSL (ft): 5352.0
Y Coordinate: 1473504.01
X Coordinate: 1542416.28

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Silty SAND (SM); brown (7.5YR 5/4); dry; dense; 85% very fine to fine sand to 0.1mm; rounded; 15% silt; low plasticity. | SM | | Kelly down @ 0831. Resumed drilling @ 0842. |
| 365 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; dense; 100% very fine to coarse sand; trace gravel to 1 cm; subrounded. | | | |
| 370 | | | | | Same as above (363 ft). | | | |
| 375 | | | | | Same as above (363 ft); slighty coarser; trace fines. | SW | Bentonite Seal | |
| 380 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 70% very fine to very coarse sand; 30% fine to medium gravel to 5cm; rounded. | | | Kelly down @ 0852. Resumed drilling @ 0900. |
| 385 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; dense; 95% very fine to very coarse sand; trace gravel to 1.3cm; subrounded; 5% silt. | | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106133

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/7/2011
Date TD Reached: 2/10/2011
Date Completed: 2/16/2011

Ground Elevation AMSL (ft): 5352.0
Y Coordinate: 1473504.01
X Coordinate: 1542416.28

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); dry; dense; 95% very fine to very coarse sand; trace gravel to 1.3cm; subrounded; 5% silt. | | | |
| 395 | | | | | Same as above (390 ft); moist; finer. | | | |
| 400 | | SB0367 | 0.3 | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; very dense; 95% very fine to very coarse sand; trace gravel to 1.3cm; subrounded; 5% silt; trace clay nodules. | SW | | Kelly down @ 0911. Blow counts (398.5-400'): 30/50. Resumed drilling @ 0943. |
| 405 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); dry; very dense; 95% fine to very coarse sand; 5% fine gravel to 1cm; subangular; trace fines. | | Bentonite Seal | |
| 410 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% medium sand to 0.5mm; subrounded; trace fines. | SP | | |
| 415 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; very dense; 95% very fine to very coarse sand to 3mm; subrounded; 5% silt. | SW | | |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106133

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/7/2011
Date TD Reached: 2/10/2011
Date Completed: 2/16/2011

Ground Elevation AMSL (ft): 5352.0
Y Coordinate: 1473504.01
X Coordinate: 1542416.28

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Silty SAND (SM); brown (7.5YR 4/3); moist; very dense; 80% very fine to very coarse sand; 5% fine gravel to 1.4cm; subangular; 10% silt; 5% clay nodules. | SM | | Resumed drilling @ 1008. |
| 425 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 100% medium sand to 0.5mm; subrounded. | SP | Bentonite Seal | |
| 430 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; very dense; 95% very fine to very coarse sand to 4mm; subangular to rounded; 5% silt. | SW | | |
| 435 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; very dense; 100% medium sand to 1mm; rounded; trace fines. Same as above (432 ft); 100% coarse sand; trace fines. | SP | | |
| 440 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); dry; very dense; 85% very fine to very coarse sand; 15% fine gravel to 1.3cm; rounded. | SW | Top of Filter Pack; Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1020. Unwrapped and wrapped sand line. Resumed drilling @ 1036. |
| 445 | | | | | Well graded SAND with Silt (SW-SM); dark yellowish brown (10YR 4/4); moist; very dense; 90% very fine to coarse sand to 4mm; subrounded; 10% silt. | SW-SM | | |
| 450 | X | SB0368 | 0.6 | | | | Bottom of Screen | Kelly down @ 1045. Blow counts (448.5-450'): 40/70. |

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# Borehole ID: KAFB-106133

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/7/2011
Date TD Reached: 2/10/2011
Date Completed: 2/16/2011

Ground Elevation AMSL (ft): 5352.0
Y Coordinate: 1473504.01
X Coordinate: 1542416.28

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | |
| | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; 95% very fine to coarse sand to 3mm; subrounded; 5% silt. | | | Resumed drilling @ 1130. |
| 455 | | | | | Same as above (450 ft). | SW | | |
| 460 | | | | | | | Bottom of Filter Pack<br>Native Backfill | |
| | | | | | | | | Total Depth = 460 ft. Reached @ 1140 on 2/10/11. |
| 465 | | | | | | | | Water added during drilling (gallons) = 0 |
| | | | | | | | | Water added during construction (gallons) = Not Recorded |
| 470 | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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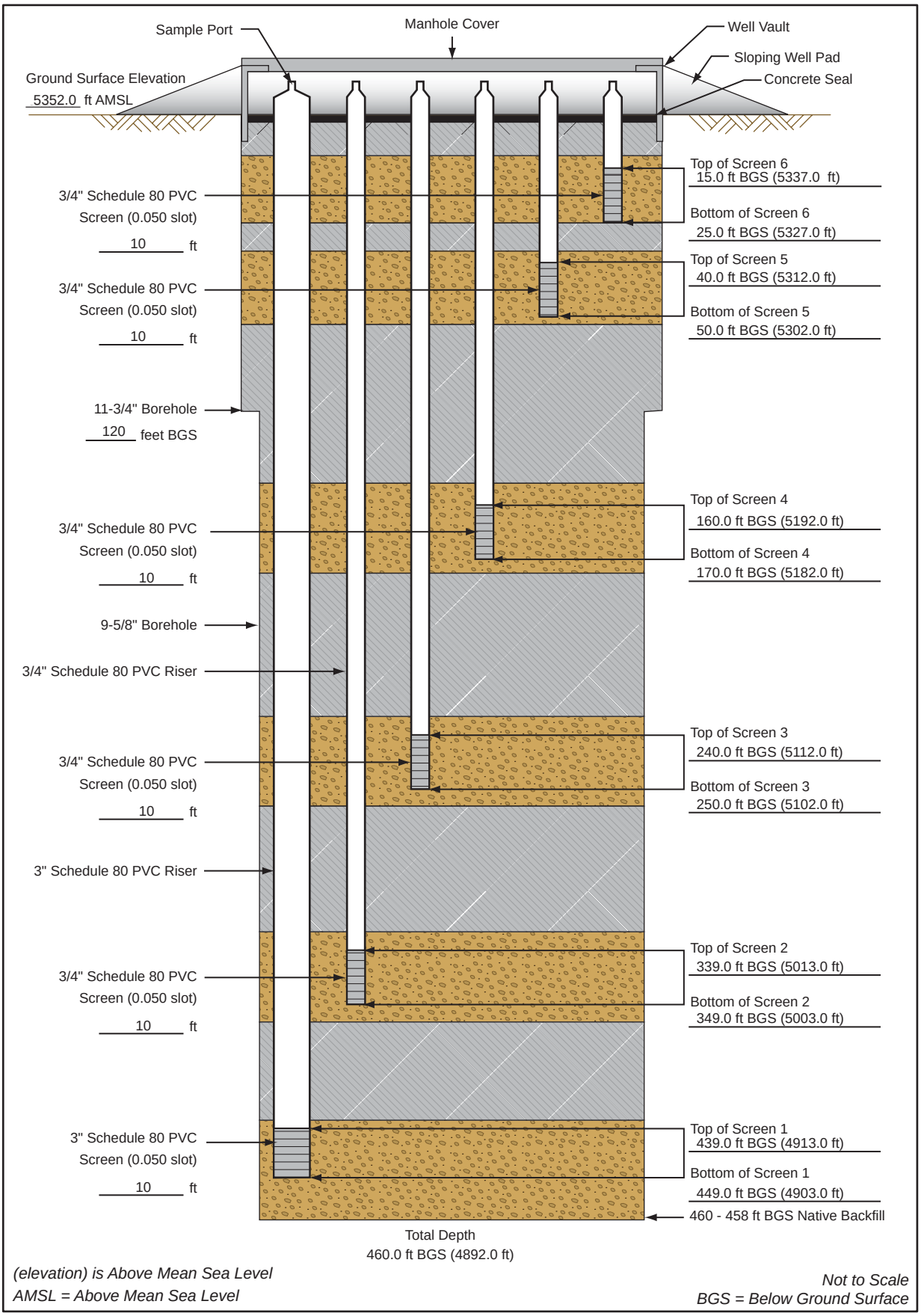
# Nested Soil Vapor Well Completion Diagram for KAFB-106133

Installation Start Date/Time: 2/15/2011 @ 08:34
Installation End Date/Time: 2/16/2011 @ 16:29



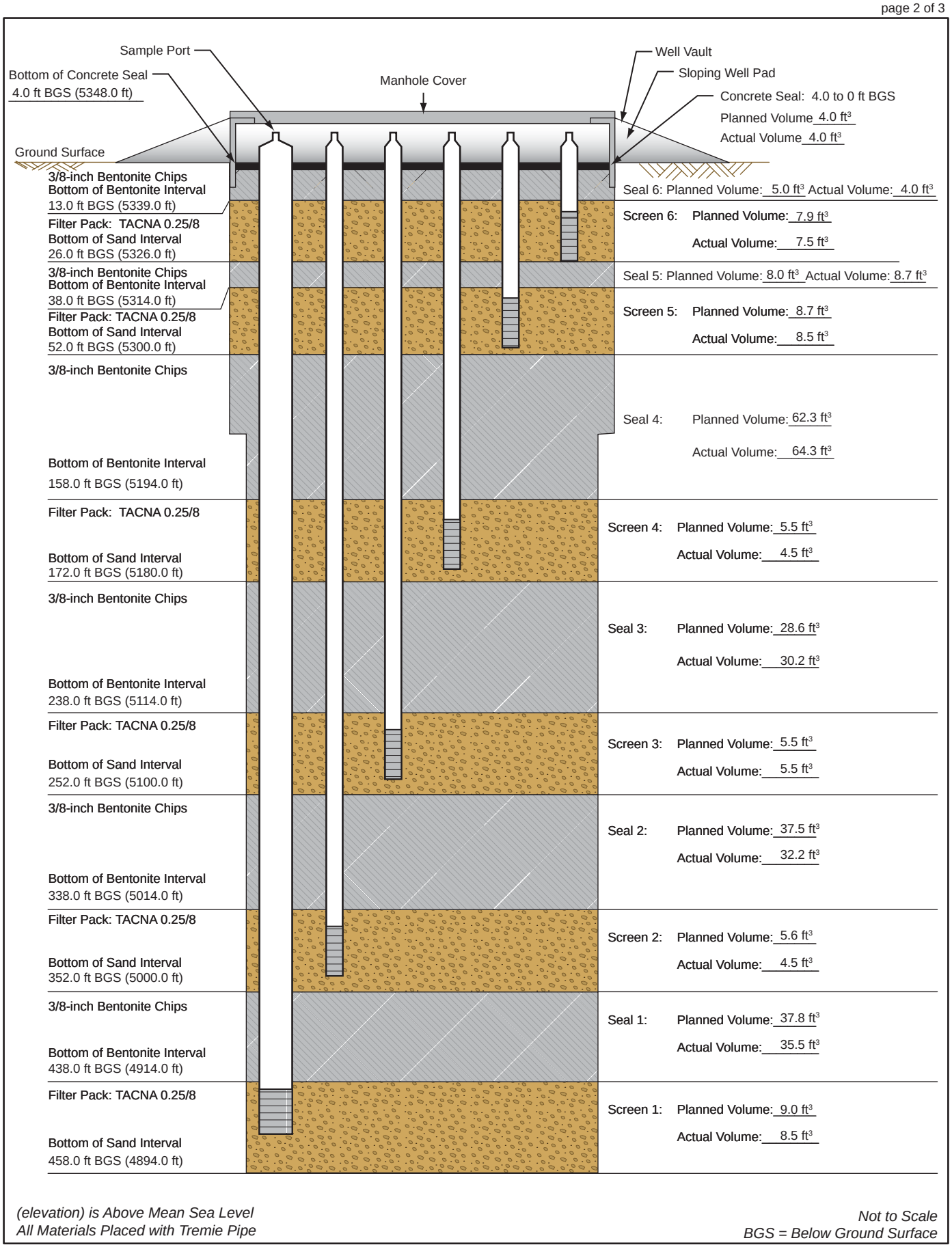



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106133






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

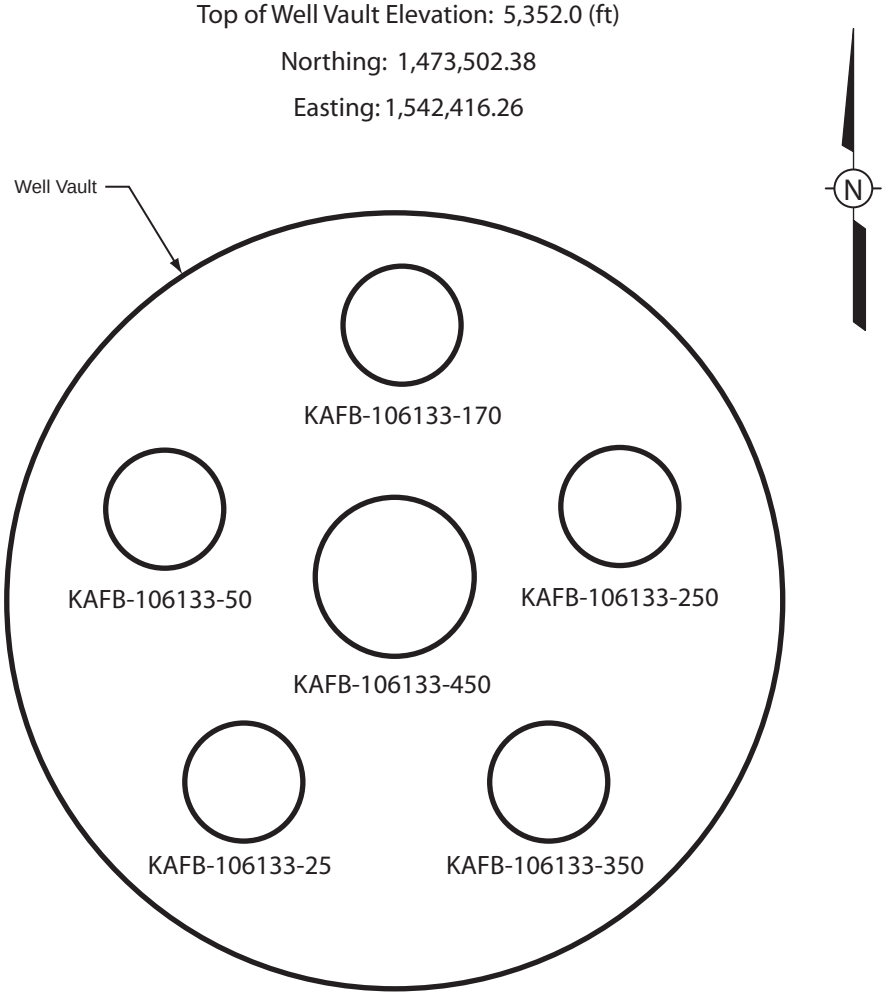
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106133



Top of Well Vault Elevation: 5,352.0 (ft)

Northing: 1,473,502.38

Easting: 1,542,416.26




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106133-25 | 3/4 | 25.0 | 15.0-25.0 | 1,473,501.59 | 1,542,416.13 | 5351.6 |
| KAFB-106133-50 | 3/4 | 50.0 | 40.0-50.0 | 1,473,501.87 | 1,542,416.05 | 5351.6 |
| KAFB-106133-170 | 3/4 | 170.0 | 160.0-170.0 | 1,473,502.09 | 1,542,416.29 | 5351.5 |
| KAFB-106133-250 | 3/4 | 250.0 | 240.0-250.0 | 1,473,501.93 | 1,542,416.53 | 5351.5 |
| KAFB-106133-350 | 3/4 | 349.0 | 339.0-349.0 | 1,473,501.62 | 1,542,416.48 | 5351.6 |
| KAFB-106133-450 | 3 | 449.0 | 439.0-449.0 | 1,473,501.87 | 1,542,416.30 | 5351.6 |

# Borehole ID: KAFB-106134

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/18/2011
Date TD Reached: 2/20/2011
Date Completed: 2/23/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473812.20
X Coordinate: 1542371.29

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; firm; nonplastic; 85% silt; 15% fine to coarse sand; rounded; caliche on sand; no odor. | | Concrete Seal | Hand augered. |
| 5 | | | | | Same as above (0 ft); low plasticity; clay nodules. | | | Began drilling @ 1232 on 2/18/11. |
| | X | SB0369 | 0.0 | | | | Bentonite Seal | Blow counts (7.5-9'): 15/7. |
| 10 | | | | | SILT (ML); strong brown (7.5YR 5/6); dry; firm; medium plasticity; 60% silt; 35% clay; 5% medium to coarse sand; no odor. | | Top of Filter Pack | |
| 15 | | | | | SILT with Gravel (ML); strong brown (7.5YR 5/6); dry; firm; non to low plasticity; 70% silt; 10% clay; 15% fine to coarse gravel; 5% coarse sand; no odor. | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| | X | SB0370 | 0.0 | | | | | Kelly down @ 1250. Blow counts (17.5-19'): 8/10. |
| 20 | X | SB0371 | 0.0 | | SILT (ML); strong brown (7.5YR 5/6); dry; firm; medium plasticity; 100% silt; trace gravel to 1cm; rounded; no odor. | | | Blow counts (19-20.5'): Not Recorded. New connection @ 1305. Resumed drilling @ 1306. |
| 25 | | | | | SILT (ML); brown (7.5YR 5/4); dry; firm; nonplastic; 100% silt with weakly indurated clay nodules to 1cm; no odor. | | Bottom of Screen | |
| | X | SB0372 | 0.0 | | | | Bentonite Seal | Kelly down @ 1308. Blow counts (27-28.5'): 22/50. New connection @ 1350. Resumed drilling @ 1352. |
| 30 | | | | | | | | |

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# Borehole ID: KAFB-106134

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/18/2011
Date TD Reached: 2/20/2011
Date Completed: 2/23/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473812.20
X Coordinate: 1542371.29

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Sandy SILT (ML); light yellowish brown (10YR 6/4); dry; soft; nonplastic; 60% silt; 35% fine to coarse sand; angular to subangular; 5% gravel; angular; no odor. | | | |
| 35 | | | | | SILT (ML); yellowish brown (10YR 5/4); dry; soft; non to low plasticity; 100% silt; no odor; caliche at 37'. | | Bentonite Seal | |
| | | SB0373 | 0.0 | | | | Top of Filter Pack | Kelly down @ 1358. Blow counts (37-38.5'): 50/Not Recorded. Blow counts (38.5-40'): 50/Not Recorded. New connection @ 1430. Resumed drilling @ 1430. |
| 40 | | SB0373 | | | Same as above (35 ft); reddish brown (5YR 5/4). | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 45 | | | | | Same as above (35 ft); light reddish brown (5YR 6/4); 75% silt; 20% clay; 5% medium to fine sand; subrounded; trace gravel; no odor. | ML | | |
| | | SB0374 | 0.0 | | | | | Kelly down @ 1439. Blow counts (47-48.5'): 12/25. New connection @ 1455. Resumed drilling @ 1456. |
| 50 | | | | | SILT with Sand (ML); brown (10YR 5/3); dry; firm; nonplastic; 75% silt; trace clay nodules; 25% fine to coarse sand; subangular to subrounded; abundant mica; no odor. | | Bottom of Screen | |
| 55 | | | | | SILT (ML); brown (10YR 4/3); dry; soft; nonplastic; 85% silt; 15% clay; no odor. | | Bentonite Seal | |
| 60 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/26/11 09:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106134

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/18/2011
Date TD Reached: 2/20/2011
Date Completed: 2/23/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473812.20
X Coordinate: 1542371.29

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT with Sand (ML); yellowish brown (10YR 5/4); dry; soft; nonplastic; 75% silt; 25% fine to coarse sand; subrounded to rounded; no odor. | | | Kelly down @ 1457. New connection @ 1510. Resumed drilling. |
| 65 | | | | | Sandy SILT (ML); yellowish brown (10YR 5/4); dry; soft; nonplastic; 55% silt; 45% fine to coarse sand; rounded; trace gravel; mica flakes; no odor. | | | |
| 70 | | | | | SILT (ML); yellowish brown (10YR 5/4); nonplastic; 100% silt; trace gravel; no odor. | | | |
| 75 | | | | | Same as above (70 ft); nonplastic; 85% silt; 15% clay; no gravel. | ML | Bentonite Seal | |
| 80 | | | | | Same as above (70 ft); clay nodules to 2cm; slightly indurated. | | | Kelly down @ 1518. New connection @ 1525. Resumed drilling @ 1525. |
| 85 | | | | | Same as above (70 ft); clay nodules to 1cm; trace sand. | | | |
| 90 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/26/11 09:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106134

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/18/2011
Date TD Reached: 2/20/2011
Date Completed: 2/23/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473812.20
X Coordinate: 1542371.29

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); yellowish brown (10YR 5/4); dry; soft; non to low plasticity; 90% silt; 10% fine to medium sand; no odor. | | | |
| 95 | | | | | Sandy SILT (ML); yellowish brown (10YR 5/4); dry; soft; nonplastic; 65% silt with clay nodules to 1.5cm; 35% very fine sand; no odor. | ML | | |
| | | SB0375 | 0.0 | | | | | Kelly down @ 1533. Blow counts (97-98.5'): 18/27. New connection @ 1550. Resumed drilling @ 1551. |
| 100 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); dry; loose; 55% fine sand; 30% medium sand; 15% coarse sand; rounded to subangular; trace gravel; no odor. | SW | | |
| 105 | | | | | SILT (ML); brown (10YR 4/3); dry; soft to stiff; low to medium plasticity; 70% silt; 30% clay; no odor. | | Bentonite Seal | |
| 110 | | | | | Same as above (105 ft). | ML | | |
| 115 | | | | | Same as above (105 ft); yellowish brown (10YR 5/4); no odor. | | | Kelly down @ 1558. New connection @ 1607. Resumed drilling @ 1608. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106134

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/18/2011
Date TD Reached: 2/20/2011
Date Completed: 2/23/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473812.20
X Coordinate: 1542371.29

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT (ML); yellowish brown (10YR 5/4); dry; soft to stiff; low to medium plasticity; 70% silt; 30% clay; no odor. | | | Kelly down @ 1610 on 2/18/11. Switched to 9-5/8" casing. New connection @ 1105 on 2/19/11. Resumed drilling @ 1109 on 2/19/11. |
| 125 | | | | | Same as above (120 ft). | ML | | |
| 130 | | | | | SILT (ML); brown (7.5YR 5/3); dry; firm; nonplastic; 95% silt; 5% fine to medium sand; subangular; no odor. | | | |
| 135 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); 95% fine to coarse sand; subangular to subrounded; trace gravel; rounded; 5% fines; no odor. | SW | Bentonite Seal | Kelly down @ 1116. New connection @ 1127. Resumed drilling @ 1128. |
| 140 | | | | | SILT (ML); brown (7.5YR 5/3); dry; soft to firm; non to low plasticity; 90% silt; 10% clay; trace coarse sand; rounded; no odor. | | | |
| 145 | | | | | Same as above (140 ft). | ML | | |
| | | SB0376 | 0.4 | | | | | Kelly down @ 1131. Blow counts (147.5-149'): 15/28. New connection @ 1146. Resumed |
| 150 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/26/11 09:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106134

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/18/2011
Date TD Reached: 2/20/2011
Date Completed: 2/23/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473812.20
X Coordinate: 1542371.29

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | SILT (ML); dark yellowish brown (10YR 4/4); dry; soft to firm; low plasticity; 80% silt; 20% clay; no odor. | | Bentonite Seal | drilling @ 1147. |
| 155 | | | | | Same as above (150 ft); yellowish brown (10YR 5/4); 90% silt; 10% fine sand; rounded to subrounded. | ML | Top of Filter Pack | Kelly down @ 1150. New connection @ 1158. Resumed drilling @ 1203. |
| 160 | | | | | Silty SAND (SM); dark grayish brown (10YR 4/2); dry; dense; 80% fine to coarse sand; rounded; trace gravel to 1cm; 20% silt; no odor. | SM | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Approximate top of Santa Fe Group. |
| 165 | | | | | SILT (ML); dark yellowish brown (10YR 4/4); dry; soft; nonplastic; 95% silt; 5% fine sand; no odor. | ML | | |
| 170 | | | | | Poorly graded SAND (SP); dark grayish brown (10YR 4/2); dry; loose to dense; 95% fine to medium sand; 5% coarse sand; rounded; no odor. | SP | Bottom of Screen | |
| 175 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); dry; loose to dense; 100% fine to coarse sand; rounded; trace gravel; rounded; rounded lapilli tuff sand; no odor. | SW | Bentonite Seal | Kelly down @ 1208. New connection @ 1246. Resumed drilling @ 1247. |
| 180 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/26/11 09:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106134

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/18/2011
Date TD Reached: 2/20/2011
Date Completed: 2/23/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473812.20
X Coordinate: 1542371.29

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); dry; loose; 100% fine to coarse sand; rounded; no odor. | | | |
| 185 | | | | | Same as above (180 ft); clay nodules. | | | |
| 190 | | | | | Same as above (180 ft). | SW | | |
| 195 | | | | | Same as above (180 ft); dense; 90% fine to coarse sand; rounded; 10% gravel to 1.5cm; rounded. | | Bentonite Seal | Kelly down @ 1253. |
| 200 | | | | | Poorly graded SAND (SP); dark grayish brown (10YR 4/2); 100% fine to meduim sand; trace coarse sand; rounded; dominantly quartz grains; no odor. | | | Blow counts (197.5-199'): 25/31. Blow counts (199-200.5'): 20/29. Note: No recovery from split spoons at 200 ft. Sample was collected at 217.5 ft. New connection @ 1314. Resumed drilling @ 1320. |
| 205 | | | | | Same as above (200 ft); 90% fine sand; 10% medium sand. | SP | | |
| 210 | | | | | | | | |

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**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/18/2011
Date TD Reached: 2/20/2011
Date Completed: 2/23/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473812.20
X Coordinate: 1542371.29

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); dry; dense; 100% fine to coarse sand; rounded; coarse sand dominantly volcanic tuff. | | | |
| 215 | | | | | Same as above (210 ft); trace gravel; rounded; less volcanic tuff sand. | | | Kelly down @ 1327. |
| | | SB0377 | 0.1 | | | | | Blow counts (217.5-219'): 12/15. New connection @ 1401. Resumed drilling. |
| 220 | | | | | Well graded SAND with Gravel (SW); dark grayish brown (10YR 4/2); dry; dense; 85% fine to coarse sand; rounded; 15% gravel to 1.5cm; rounded; no odor. | | Bentonite Seal | |
| 225 | | | | | Well graded SAND (SW); dark grayish bown (10YR 4/2); dry; dense; 90% fine to coarse sand; rounded; 10% gravel to 2cm; rounded; no odor. | SW | | |
| 230 | | | | | Same as above (225 ft); 95% fine to coarse sand; 5% gravel. | | | |
| 235 | | | | | Same as above (225 ft). | | | Kelly down @ 1410. New connection @ 1419. Resumed drilling @ 1420. |
| 240 | | | | | | | Top of Filter Pack | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/26/11 09:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106134

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/18/2011
Date TD Reached: 2/20/2011
Date Completed: 2/23/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473812.20
X Coordinate: 1542371.29

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); dry; dense; 90% fine to coarse sand; rounded; 10% gravel; rounded; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 245 | | | | | Same as above (240 ft). | SW | | Kelly down @ 1424. |
| | | SB0378, SB0378-MS | 0.4 | | | | | Blow counts (247.5-249'): 27/37. Blow counts (249-250.5'): 38/50. New connection @ 1445. Resumed drilling @ 1446. |
| 250 | | SB0378-MSD | 0.4 | | | | Bottom of Screen | |
| | | | | | Poorly graded SAND (SP); dark grayish brown (10YR 4/2); dry; medium dense; 95% fine to medium sand; rounded; 5% coarse sand; rounded; trace gravel; rounded; no odor. | SP | | |
| 255 | | | | | SILT (ML); dark yellowish brown (10YR 4/4); dry; firm to stiff; nonplastic; 100% silt; no odor. | | | Kelly down @ 1452. New connection @ 1500. Resumed drilling @ 1501. |
| 260 | | | | | SILT (ML); dark yellowish brown (10YR 4/4); dry; stiff; medium plasticity; 65% silt; 35% clay; no odor. | ML | Bentonite Seal | |
| 265 | | | | | Same as above (260 ft); 95% fines; 5% fine to coarse sand. | | | |
| 270 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/26/11 09:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106134

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/18/2011
Date TD Reached: 2/20/2011
Date Completed: 2/23/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473812.20
X Coordinate: 1542371.29

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | SILT (ML); dark yellowish brown (10YR 4/4); dry; stiff; medium plasticity; 95% silt with clay; 5% fine to coarse sand; rounded; no odor. | | | |
| 275 | | | | | SILT (ML); yellowish brown (10YR 5/4); dry; stiff; nonplastic; 95% silt; 5% clay. | | | Kelly down @ 1511 on 2/19/11. New connection @ 0807 on 2/20/11. Resumed drilling @ 0809 on 2/20/11. |
| 280 | | | | | SILT (ML); brown (7.5YR 4/3); dry; stiff; low to medium plasticity; 75% silt; 25% clay nodules; trace sand; rounded; no odor. | ML | | |
| 285 | | | | | Same as above (280 ft). | | Bentonite Seal | |
| 290 | | | | | Poorly graded SAND (SP); dark grayish brown (10YR 4/2); dry; dense; 100% fine to medium sand; subrounded; trace coarse sand; no odor. | SP | | |
| 295 | | | | | Poorly graded SAND with Silt (SP-SM); dark grayish brown (10YR 4/2); dry; dense; 90% fine sand; rounded; 10% silt; nonplastic; no odor. | SP-SM | | Kelly down @ 0836. |
| | | SB0379 | 0.0 | | | | | Blow counts (297-298.5'): 17/38. New connection @ 0954. Resumed drilling @ 0954. |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/26/11 09:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

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**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/18/2011
Date TD Reached: 2/20/2011
Date Completed: 2/23/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473812.20
X Coordinate: 1542371.29

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); dry; dense; 95% fine to coarse sand; rounded to subrounded; 5% gravel; rounded; no odor. | SW | | |
| 305 | | | | | Poorly graded SAND (SP); dark grayish brown (10YR 4/2); dry; dense; 100% fine to medium sand; subangular to subrounded; trace coarse sand; no odor. | | | |
| 310 | | | | | Same as above (305 ft); 100% fine sand; trace medium sand; rounded; trace gravel; rounded. | | | |
| 315 | | | | | Same as above (305 ft); 85% fine sand; 10% medium sand; rounded; 5% gravel to 3cm; rounded | SP | Bentonite Seal | Kelly down @ 1010. New connection @ 1017. Resumed drilling @ 1017. |
| 320 | | | | | Same as above (305 ft). | | | |
| 325 | | | | | Poorly graded GRAVEL with Sand (GP); dark grayish brown (10YR 4/2); dry; dense; 55% fine to medium gravel; rounded; 45% fine to coarse sand; rounded; no odor. | GP | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/26/11 09:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106134

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/18/2011
Date TD Reached: 2/20/2011
Date Completed: 2/23/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473812.20
X Coordinate: 1542371.29

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Poorly graded GRAVEL (GP); dark grayish bown (10YR 4/2); dry; dense; 90% fine to medium gravel; rounded; 10% coarse sand; rounded; no odor. | GP | Bentonite Seal | |
| 335 | | | | | Poorly graded SAND (SP); dark grayish brown (10YR 4/2); dry; dense; 100% fine to medium sand; subrounded to subangular; trace gravel; no odor. | SP | Top of Filter Pack | Kelly down @ 1031. New connection @ 1042. Resumed drilling @ 1042. |
| 340 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); dry; dense; 100% fine to coarse sand; rounded; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 345 | | | | | Same as above (340 ft); 90% fine to coarse sand; 10% gravel to 2cm; rounded. | | | Kelly down @ 1052. |
| | | SB0380 | 0.0 | | | | | Blow counts (347-348.5'): 26/50. Blow counts (348.5-350'): 21/28. New connection @ 1120. Resumed drilling @ 1121. |
| 350 | | SB0380 | | | Well graded SAND with Gravel (SW); dark grayish brown (10YR 4/2); dry; dense; 75% fine to coarse sand; rounded; 25% fine gravel to 1.5cm; rounded; no odor. | SW | Bottom of Screen | |
| 355 | | | | | Same as above (350 ft). | | Bentonite Seal | Kelly down @ 1127. New connection @ 1133. Resumed drilling @ 1134. |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106134

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/18/2011
Date TD Reached: 2/20/2011
Date Completed: 2/23/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473812.20
X Coordinate: 1542371.29

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); dry; dense; 90% fine to coarse sand; rounded; 10% gravel to 2cm; rounded; no odor. | | | |
| 365 | | | | | Same as above (360 ft); 95% fine to coarse sand; 5% gravel. | | | |
| 370 | | | | | Well graded SAND with Gravel (SW); dark grayish brown (10YR 4/2); dry; dense; 65% fine to coarse sand; rounded; 35% fine to medium gravel; rounded; no odor. | SW | | |
| 375 | | | | | Well graded SAND with Gravel (SW); dark grayish brown (10YR 4/2); dry; dense; 85% fine to coarse sand; rounded; 15% gravel to 2.5cm; rounded; no odor. | | Bentonite Seal | Kelly down @ 1143. New connection @ 1148. Resumed drilling @ 1150. |
| 380 | | | | | Well graded SAND with Gravel (SW); dark grayish brown (10YR 4/2); dry; dense; 55% fine to coarse sand; rounded; 45% fine to medium gravel; rounded; no odor. | | | |
| 385 | | | | | Poorly graded SAND (SP); dark grayish brown (10YR 4/2); dry; dense; 95% fine to medium sand; subrounded; 5% coarse sand; rounded; trace gravel; rounded; no odor. | SP | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106134

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/18/2011
Date TD Reached: 2/20/2011
Date Completed: 2/23/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473812.20
X Coordinate: 1542371.29

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); dark grayish brown (10YR 4/2); dry; dense; 100% fine sand; rounded; trace medium sand; rounded; no odor. | | | |
| 395 | | | | | Same as above (390 ft); 100% fine to medium sand; rounded to subrounded. | SP | | Kelly down @ 1158. |
| | | SB0381 | 0.1 | | | | | Blow counts (397-398.5'): 29/47. New connection @1220. Resumed drilling @ 1258. |
| 400 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); dry; dense; 100% fine to coarse sand; rounded; trace gravel; no odor. | SW | | |
| 405 | | | | | Poorly graded SAND (SP); dark grayish brown (10YR 4/2); dry; dense; 100% fine to medium sand; rounded to subrounded; trace fines; no odor. | | Bentonite Seal | |
| 410 | | | | | Same as above (405 ft); trace coarse sand; rounded. | SP | | |
| 415 | | | | | Same as above (405 ft). | | | Kelly down @ 1307. New connection @ 1319. Resumed drilling @ 1320. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106134

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/18/2011
Date TD Reached: 2/20/2011
Date Completed: 2/23/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473812.20
X Coordinate: 1542371.29

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); dry; dense; 100% fine to coarse sand; rounded; trace gravel to 1cm; rounded; no odor. | SW | | |
| 425 | | | | | Poorly graded SAND (SP); dark grayish brown (10YR 4/2); dry; dense; 100% fine to medium sand; rounded; trace coarse sand; trace fines; no odor. | SP | Bentonite Seal | |
| 430 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); dry; dense; 100% fine to coarse sand; subrounded to subangular; no odor. | | | |
| 435 | | | | | Same as above (430 ft); 90% fine to coarse sand; 10% gravel to 1cm; rounded. | | | Kelly down @ 1332. New connection @ 1340. Resumed drilling @ 1341. |
| 440 | | | | | Same as above (430 ft); 95% fine to coarse sand; rounded; 5% gravel; rounded. | SW | Top of Filter Pack<br>Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 445 | | | | | Same as above (430 ft); 100% fine to coarse sand; rounded to angular; evenly distributed. | | | Kelly down @ 1347. |
| | | SB0382 | NR | | | | | Blow counts (447-448.5'): 50/NA. Blow counts (448.5-450'): 50/NA. No recovery. Note: |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106134

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/18/2011
Date TD Reached: 2/20/2011
Date Completed: 2/23/2011

Ground Elevation AMSL (ft): 5347.6
Y Coordinate: 1473812.20
X Coordinate: 1542371.29

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); dry; dense; 95% fine to coarse sand; rounded; 5% fine gravel to 1.5cm; rounded; no odor. | SW | Bottom of Screen | insufficient volume for headspace meausrement. New connection @ 1414. Resumed drilling @ 1415. |
| 455 | | | | | Same as above (450 ft); 95% fine to coarse sand; 5% clay nodules to 3mm. | | | Kelly down @ 1525. Attempted to collect additional spilt spoon sample, but no recovery. Blow counts (457-458.5'): 50/Not Recorded. |
| 460 | | | | | Poorly graded SAND (SP); grayish brown (10YR 5/2); dry; dense; 95% fine sand; rounded; 5% gravel to 2.5cm; rounded; no odor. | SP | | Total depth = 460 ft. Reached @ 1445 on 2/20/11. Water added during drilling (gallons) = 0 |
| 465 | | | | | | | | Water added during construction (gallons) = Not Recorded |
| 470 | | | | | | | | Kelly down: TD the joint and ready to make new connection |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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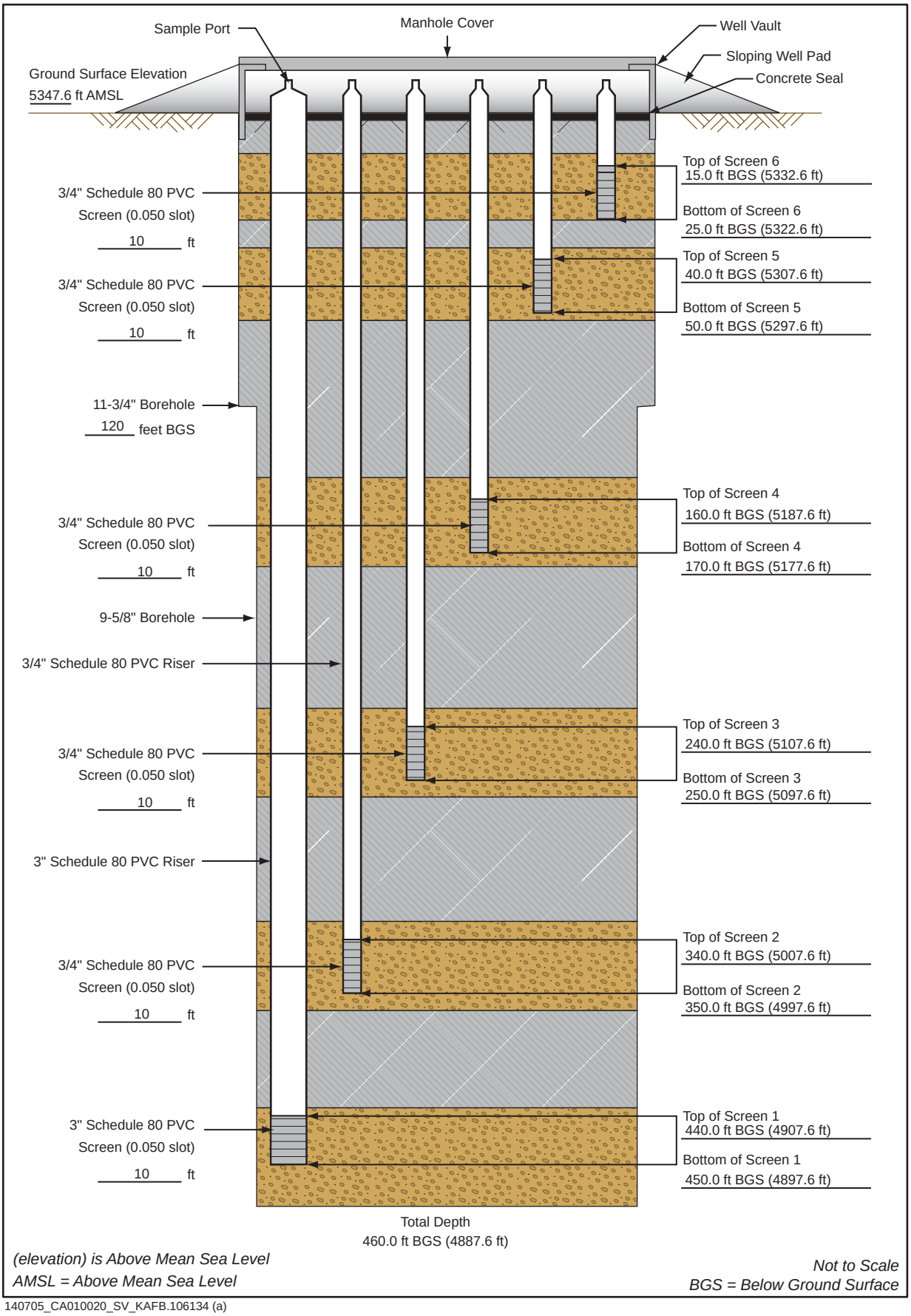
# Nested Soil Vapor Well Completion Diagram for KAFB-106134

Installation Start Date/Time: 2/21/2011 @ 08:10
Installation End Date/Time: 2/23/2011 @ 12:00



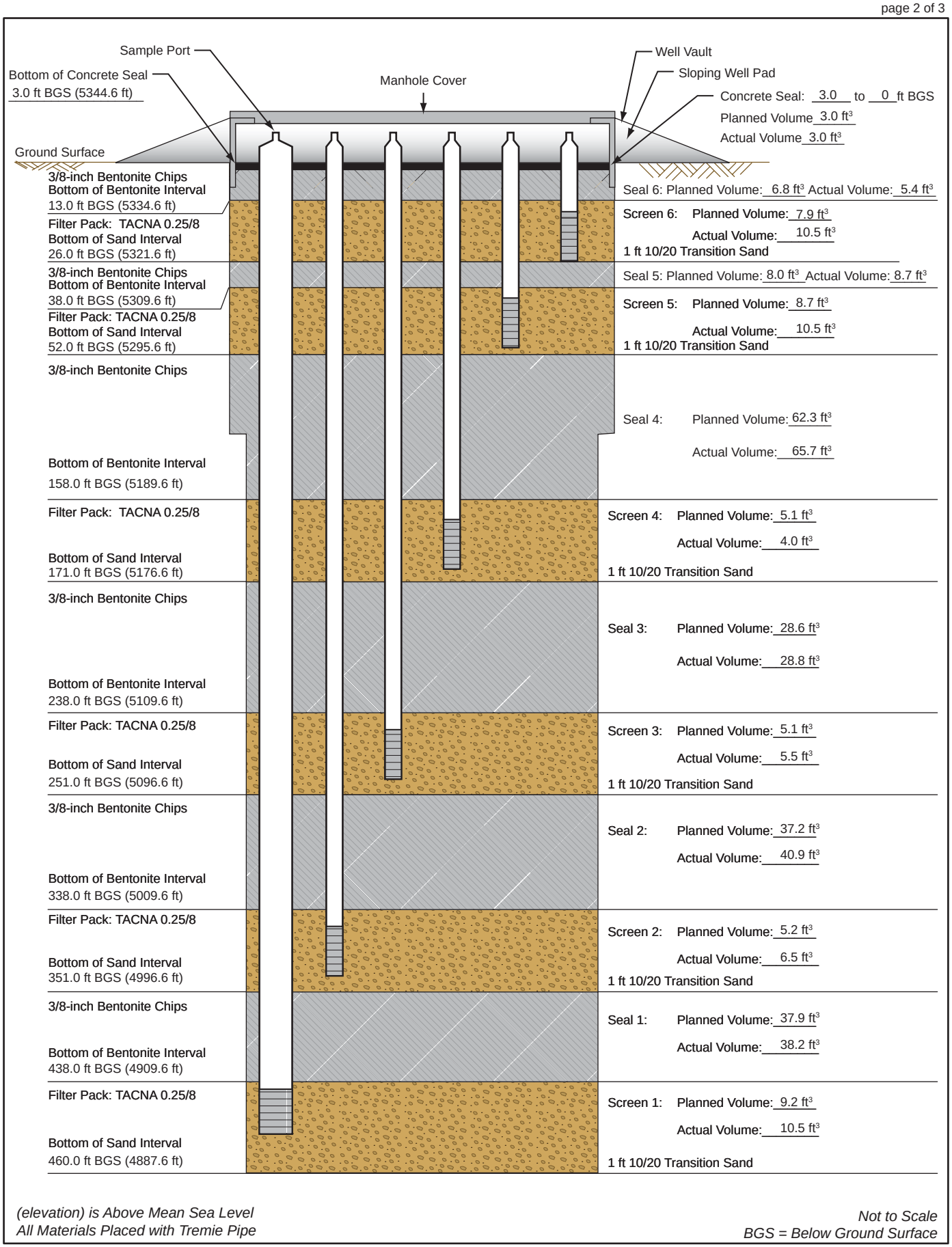



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106134






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

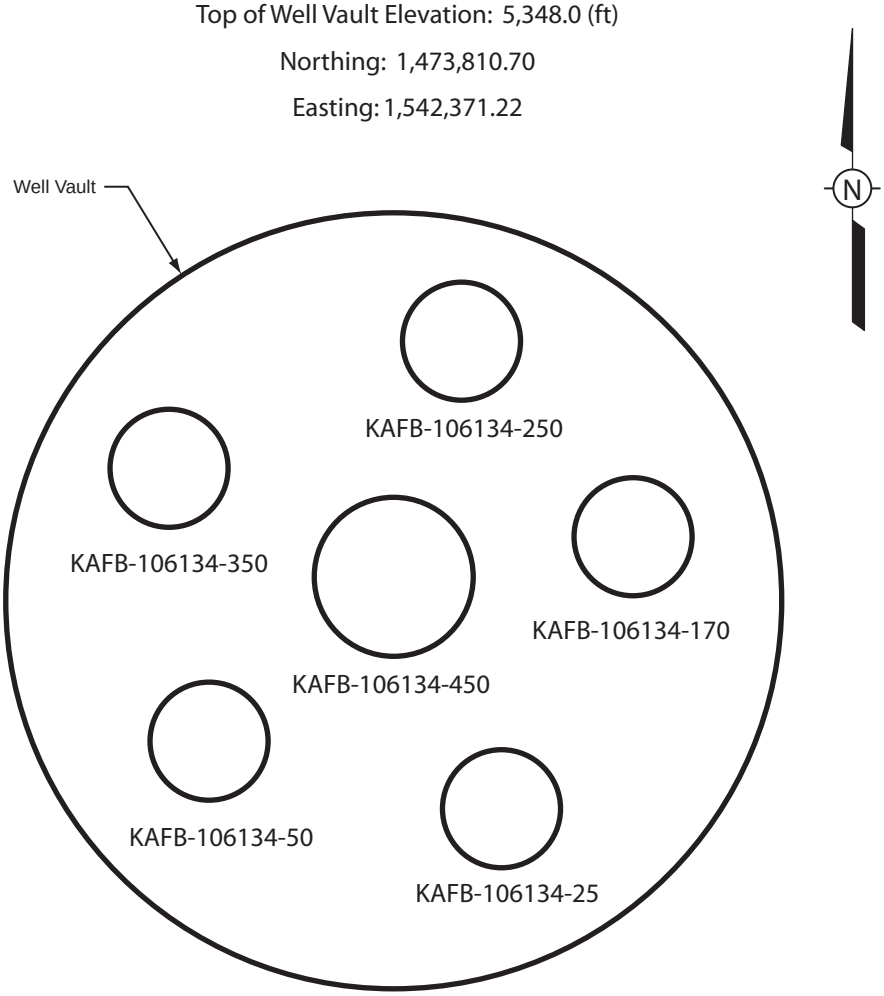
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106134



Top of Well Vault Elevation: 5,348.0 (ft)

Northing: 1,473,810.70

Easting: 1,542,371.22




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106134-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1,473,809.91 | 1,542,371.26 | 5347.5 |
| KAFB-106134-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1,473,809.94 | 1,542,370.98 | 5347.5 |
| KAFB-106134-170 | 3/4 | 170.0 | 160.0 - 170.0 | 1,473,810.19 | 1,542,371.37 | 5347.5 |
| KAFB-106134-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1,473,810.38 | 1,542,371.17 | 5347.4 |
| KAFB-106134-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1,473,810.22 | 1,542,370.87 | 5347.5 |
| KAFB-106134-450 | 3 | 450.0 | 440.0 - 450.0 | 1,473,810.24 | 1,542,371.14 | 5347.5 |

# Borehole ID: KAFB-106135

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/23/2011
Date TD Reached: 1/23/2011
Date Completed: 2/5/2011

Ground Elevation AMSL (ft): 5351.1
Y Coordinate: 1474070.68
X Coordinate: 1542905.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | No description recorded. | | Concrete Seal | Hand augered.<br>***Note: no headspace requirement at this location*** |
| 5 | | | | | Sandy SILT (ML); light brown (7.5YR 6/4); dry; very soft; low plasticity; 70% silt; 25% very fine sand; 5% medium sand to 0.4mm. | | Bentonite Seal | Began drilling @ 0755 on 1/23/11. |
| 10 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); moist; very soft; low plasticity; 70% silt; trace clay nodules; 25% very fine sand; 5% medium sand to 0.4mm. | | Top of Filter Pack | |
| 15 | | | | | Same as above (10 ft); trace fine gravel to 7mm. | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 20 | | | | | Same as above (10 ft); dry. | | | |
| 25 | | | | | Same as above (10 ft); dry; no clay. | | Bottom of Screen | |
| 30 | | | | | | | Bentonite Seal | |

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# Borehole ID: KAFB-106135

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/23/2011
Date TD Reached: 1/23/2011
Date Completed: 2/5/2011

Ground Elevation AMSL (ft): 5351.1
Y Coordinate: 1474070.68
X Coordinate: 1542905.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); moist; very soft; low plasticity; 70% silt; 25% very fine sand; 5% medium sand to 0.4mm. | | Bentonite Seal | |
| 35 | | | | | Same as above (30 ft); trace clay nodules. | | Top of Filter Pack | |
| 40 | | | | | Same as above (30 ft); trace clay nodules. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 45 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; very soft; low plasticity; 80% silt; 10% coarse sand; 10% fine gravel to 7mm. | ML | | |
| 50 | | | | | SILT with Sand (ML); reddish brown (5YR 5/4); dry; very soft; low plasticity; 80% silt; 5% clay; 15% very fine sand to 0.2mm. | | Bottom of Screen | |
| 55 | | | | | SILT (ML); reddish brown (5YR 5/4); dry; very soft; low plasticity; 80% silt; 10% lean clay; 10% very coarse sand. | | Bentonite Seal | |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106135

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/23/2011
Date TD Reached: 1/23/2011
Date Completed: 2/5/2011

Ground Elevation AMSL (ft): 5351.1
Y Coordinate: 1474070.68
X Coordinate: 1542905.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; very soft; low plasticity; 80% silt; 15% very fine sand; 5% fine gravel to 4mm. | | | |
| 65 | | | | | Same as above (60 ft). | | | |
| 70 | | | | | Same as above (60 ft); trace clay nodules. | | | |
| 75 | | | | | Same as above (60 ft); no gravel. | ML | Bentonite Seal | |
| 80 | | | | | Sandy SILT (ML); strong brown (7.5YR 4/6); dry; soft; low plasticity; 60% silt; 30% medium sand; 10% fine gravel to 5mm. | | | |
| 85 | | | | | Sandy SILT (ML); strong brown (7.5YR 4/6); dry; soft; low plasticity; 60% silt; trace clay nodules; 40% fine sand to 0.1mm. | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106135

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/23/2011
Date TD Reached: 1/23/2011
Date Completed: 2/5/2011

Ground Elevation AMSL (ft): 5351.1
Y Coordinate: 1474070.68
X Coordinate: 1542905.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); dry; soft; low plasticity; 60% silt; 40% fine sand to 0.1mm. | | | |
| 95 | | | | | Same as above (90 ft); 60% silt; 40% very fine sand. | | | |
| 100 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; soft; medium plasticity; 70% silt; 15% clay; 15% very fine sand to 0.07mm. | | | |
| 105 | | | | | Same as above (100 ft); 70% silt; 10% clay; 15% very fine sand. | ML | Bentonite Seal | |
| 110 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); dry; soft; low plasticity; 70% silt; 30% very fine to medium sand to 0.4mm; trace clay nodules. | | | |
| 115 | | | | | Same as above (110 ft). | | | |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106135

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/23/2011
Date TD Reached: 1/23/2011
Date Completed: 2/5/2011

Ground Elevation AMSL (ft): 5351.1
Y Coordinate: 1474070.68
X Coordinate: 1542905.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT (ML); brown (7.5YR 5/4); dry; soft; medium plasticity; 80% silt; 10% clay; 10% very fine sand to 0.06mm. | | | Pulled drill string and began installing 9-5/8" casing @ 0930. |
| 125 | | | | | SILT with Sand (ML); brown (7.5YR 4/4); moist; soft; low plasticity; 70% silt; 5% clay; 25% very fine sand. | ML | Bentonite Seal | Began drilling 9-5/8" casing @ 1110. |
| 130 | | | | | Same as above (125 ft); trace fine gravel to 8mm. | | | |
| 135 | | | | | Silty SAND (SM); brown (7.5YR 4/4); dry; very loose; 80% fine sand to 0.1mm; rounded; 20% silt. | | Top of Filter Pack | |
| 140 | | | | | Same as above (135 ft); trace medium sand. | SM | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 145 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); dry; very soft; 70% silt; 30% very fine to fine sand to 0.2mm. | ML | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106135

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/23/2011
Date TD Reached: 1/23/2011
Date Completed: 2/5/2011

Ground Elevation AMSL (ft): 5351.1
Y Coordinate: 1474070.68
X Coordinate: 1542905.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); dry; very soft; 70% silt; 30% very fine to fine sand to 0.2mm. | | Bottom of Screen | |
| 155 | | | | | Same as above (150 ft); brown (7.5YR 4/3). | | | |
| 160 | | | | | Same as above (150 ft); moist; trace fine gravel to 4mm. | ML | | |
| 165 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); dry; very soft; low plasticity; 60% silt; 30% fine sand; 10% medium sand; trace fine gravel to 5mm. | | Bentonite Seal | |
| 170 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; very loose; 80% medium sand; 15% fine sand; 5% coarse sand; trace gravel to 1cm; subrounded. | SP | | |
| 175 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; very loose; 85% very fine to very coarse sand; 10% fine gravel to 1.6cm; subrounded; 5% silt. | SW | | |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106135

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/23/2011
Date TD Reached: 1/23/2011
Date Completed: 2/5/2011

Ground Elevation AMSL (ft): 5351.1
Y Coordinate: 1474070.68
X Coordinate: 1542905.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Lean Clay (CL); brown (10YR 5/3); damp; soft; high plasticity; 60% clay; 30% silt; 10% fine sand to 0.08mm. | CL | | |
| 185 | | | | | Well graded SAND with Silt (SW-SM); grayish brown (10YR 5/2); dry; very loose; 80% very fine to coarse sand; 5% very fine gravel to 5mm; subrounded; 10% silt. | SW-SM | | |
| 190 | | | | | Silty SAND (SM); yellowish brown (10YR 5/4); moist; very loose; 75% very fine to very coarse sand; 10% fine gravel to 4mm; rounded; 15% silt; trace clay nodules. | SM | Bentonite Seal | |
| 195 | | | | | Well graded SAND with Silt (SW-SM); brown (10YR 5/3); dry; very loose; 90% very fine to coarse sand; trace fine gravel to 1cm; rounded; 10% silt. | SW-SM | | |
| 200 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; very loose; 95% very fine to coarse sand; trace gravel to 8mm; subangular; 5% silt. | SW | | |
| 205 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; very loose; 95% medium sand to 0.4mm; subrounded; 5% silt. | SP | Native Backfill<br>Bentonite Seal | |
| 210 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/25/11 15:07 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106135

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/23/2011
Date TD Reached: 1/23/2011
Date Completed: 2/5/2011

Ground Elevation AMSL (ft): 5351.1
Y Coordinate: 1474070.68
X Coordinate: 1542905.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND (SW); brown (10YR 4/3); moist; loose; 95% very fine to coarse sand; trace gravel to 8mm; subangular; 5% silt. | SW | | |
| 215 | | | | | Sandy SILT (ML); brown (10YR 5/3); moist; soft; low plasticity; 60% silt; 40% very fine sand to 0.08mm. | ML | | |
| 220 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 90% very fine to very coarse sand; 10% fine gravel to 1cm; subrounded. | SW | Bentonite Seal | |
| 225 | | | | | Same as above (220 ft); 15% gravel to 3cm. | | | |
| 230 | | | | | Same as above (220 ft). | | | |
| 235 | | | | | Same as above (220 ft). | | Top of Filter Pack | |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106135

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/23/2011
Date TD Reached: 1/23/2011
Date Completed: 2/5/2011

Ground Elevation AMSL (ft): 5351.1
Y Coordinate: 1474070.68
X Coordinate: 1542905.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 90% very fine to very coarse sand; 10% fine gravel to 1cm; subrounded. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 245 | | | | | Same as above (240 ft). | | | |
| 250 | | | | | Same as above (240 ft). | | Bottom of Screen | |
| 255 | | | | | Same as above (240 ft). | SW | | |
| 260 | | | | | Same as above (240 ft). | | Bentonite Seal | |
| 265 | | | | | Same as above (240 ft). | | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106135

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/23/2011
Date TD Reached: 1/23/2011
Date Completed: 2/5/2011

Ground Elevation AMSL (ft): 5351.1
Y Coordinate: 1474070.68
X Coordinate: 1542905.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Lean Clay (CL); brown (10YR 5/3); moist; soft; low plasticity; 90% clay; 10% silt to 0.01mm. | CL | | |
| 275 | | | | | Well graded SAND with Silt (SW-SM); grayish brown (10YR 5/2); moist; loose; 90% very fine to very coarse sand; trace gravel to 4mm; subrounded; 10% silt. | SW-SM | | |
| 280 | | | | | Same as above (275 ft). | | | |
| 285 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); moist; loose; 95% very fine sand to 0.04mm; rounded; 5% silt. | SP | Bentonite Seal | |
| 290 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; very loose; 70% medium sand; 30% fine sand; trace fine gravel to 5mm; rounded; trace fines. | | | |
| 295 | | | | | Well graded SAND (SW); brown (10YR 4/3); moist; very loose; 100% very fine to very coarse sand; trace fine gravel to 8mm; subrounded; trace fines. | SW | | |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106135

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/23/2011
Date TD Reached: 1/23/2011
Date Completed: 2/5/2011

Ground Elevation AMSL (ft): 5351.1
Y Coordinate: 1474070.68
X Coordinate: 1542905.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Silty SAND (SM); brown (10YR 4/3); damp; loose; 70% fine sand to 0.08mm; subrounded; 20% silt; 10% clay. | SM | | |
| 305 | | | | | Lean CLAY (CL); brown (10YR 5/3); moist; soft; medium plasticity; 70% clay; 30% silt to 0.01mm. | CL | | |
| 310 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; very loose; 90% medium sand; 10% coarse sand to 3mm; subrounded. | SP | Bentonite Seal | |
| 315 | | | | | Same as above (310 ft); trace clay nodules. | | | |
| 320 | | | | | Same as above (310 ft); moist; 5% gravel to 6mm. | | | |
| 325 | | | | | Same as above (310 ft); 90% coarse sand; gravel to 1.4cm. | | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106135

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/23/2011
Date TD Reached: 1/23/2011
Date Completed: 2/5/2011

Ground Elevation AMSL (ft): 5351.1
Y Coordinate: 1474070.68
X Coordinate: 1542905.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; very loose; 90% medium sand; 10% coarse sand to 3mm; subrounded. | | Bentonite Seal | |
| 335 | | | | | Poorly graded SAND with Gravel (SP); dark yellowish brown (10YR 4/4); moist; loose; 80% fine sand; 15% fine gravel to 7mm; subangular; 5% fines. | SP | Top of Filter Pack | |
| 340 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; very loose; 90% coarse sand; 10% fine gravel to 8mm; subrounded. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| | | | | | Poorly graded GRAVEL with Sand (GP); yellowish brown (10YR 5/4); dry; loose; 80% fine to medium gravel to 3.5cm; well rounded; 20% medium to coarse sand. | GP | | |
| 345 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); damp; loose; 100% coarse sand to 2mm; rounded; trace fines. | SP | | Driller added ~10 gallons H2O. |
| 350 | | | | | No cuttings returned. | | Bottom of Screen | |
| 355 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); damp; loose; 100% coarse sand to 2mm; rounded; trace gravel to 9mm; trace fines; | SP | Bentonite Seal | |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106135

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/23/2011
Date TD Reached: 1/23/2011
Date Completed: 2/5/2011

Ground Elevation AMSL (ft): 5351.1
Y Coordinate: 1474070.68
X Coordinate: 1542905.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); damp; loose; 100% coarse sand to 2mm; rounded; trace fines. | | | |
| 365 | | | | | Same as above (360 ft); 100% medium sand; trace clay nodules. | SP | | |
| 370 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); moist; very loose; 85% very fine to coarse sand; 15% fine gravel to 5mm; well rounded. | | | |
| 375 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; very loose; 95% very fine to coarse sand; 5% fine gravel to 5mm; well rounded. | SW | Bentonite Seal | |
| 380 | | | | | Same as above (375 ft). | | | Driller added ~10 gallons H2O. |
| 385 | | | | | Poorly graded SAND with Gravel (SP); dark yellowish brown (10YR 4/4); dry; loose; 85% medium sand; 15% fine gravel to 2cm; subrounded. | SP | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106135

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/23/2011
Date TD Reached: 1/23/2011
Date Completed: 2/5/2011

Ground Elevation AMSL (ft): 5351.1
Y Coordinate: 1474070.68
X Coordinate: 1542905.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); damp; loose; 95% coarse to very coarse sand; 5% fine gravel to 1.6cm; rounded. | | | |
| 395 | | | | | Same as above (390 ft); no gravel. | | | Driller added ~10 gallons H2O. |
| 400 | | | | | Same as above (390 ft); no gravel. | SP | | |
| 405 | | | | | As above (390 ft); 95% medium sand; 5% coarse sand; no gravel. | | Bentonite Seal | |
| 410 | | | | | As above (390 ft); 95% medium sand; 5% coarse sand; no gravel. | | | |
| 415 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); damp; very loose; 100% fine to very coarse sand to 3mm; subangular; trace fines. | SW | | |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106135

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/23/2011
Date TD Reached: 1/23/2011
Date Completed: 2/5/2011

Ground Elevation AMSL (ft): 5351.1
Y Coordinate: 1474070.68
X Coordinate: 1542905.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); damp; very loose; 100% fine to very coarse sand to 3mm; subangular; trace fines. | SW | | |
| 425 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); moist; very loose; 100% medium sand; trace gravel to 8mm. | | Bentonite Seal | Driller added ~10 gallons H2O. |
| 430 | | | | | Same as above (425 ft); 5% fine gravel to 1 cm. | | | |
| 435 | | | | | Same as above (425 ft); 100% coarse sand; trace clay nodules. | SP | Top of Filter Pack | |
| 440 | | | | | Same as above (425 ft); no gravel. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 445 | | | | | Same as above (425 ft); no gravel. | | | |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106135

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/23/2011
Date TD Reached: 1/23/2011
Date Completed: 2/5/2011

Ground Elevation AMSL (ft): 5351.1
Y Coordinate: 1474070.68
X Coordinate: 1542905.14

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); moist; very loose; 100% medium sand; no gravel. | SP | Bottom of Screen; Bottom of Filter Pack | |
| 455 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); moist; very loose; 85% medium sand; 10% coarse sand to 1.2mm; subrounded; 5% fines. | | Native Backfill | |
| | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; very loose; 95% very fine to very coarse sand; 5% fine gravel to 4mm; subangular. | SW | | |
| 460 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); dry; very loose; 90% medium sand to 0.7mm; 10% fine sand; subangular. | SP | | Total depth = 460 ft. Reached @ 1550 on 1/23/11. |
| 465 | | | | | | | | Water added during drilling (gallons) = 40 |
| 470 | | | | | | | | Water added during construction (gallons) = Not Recorded |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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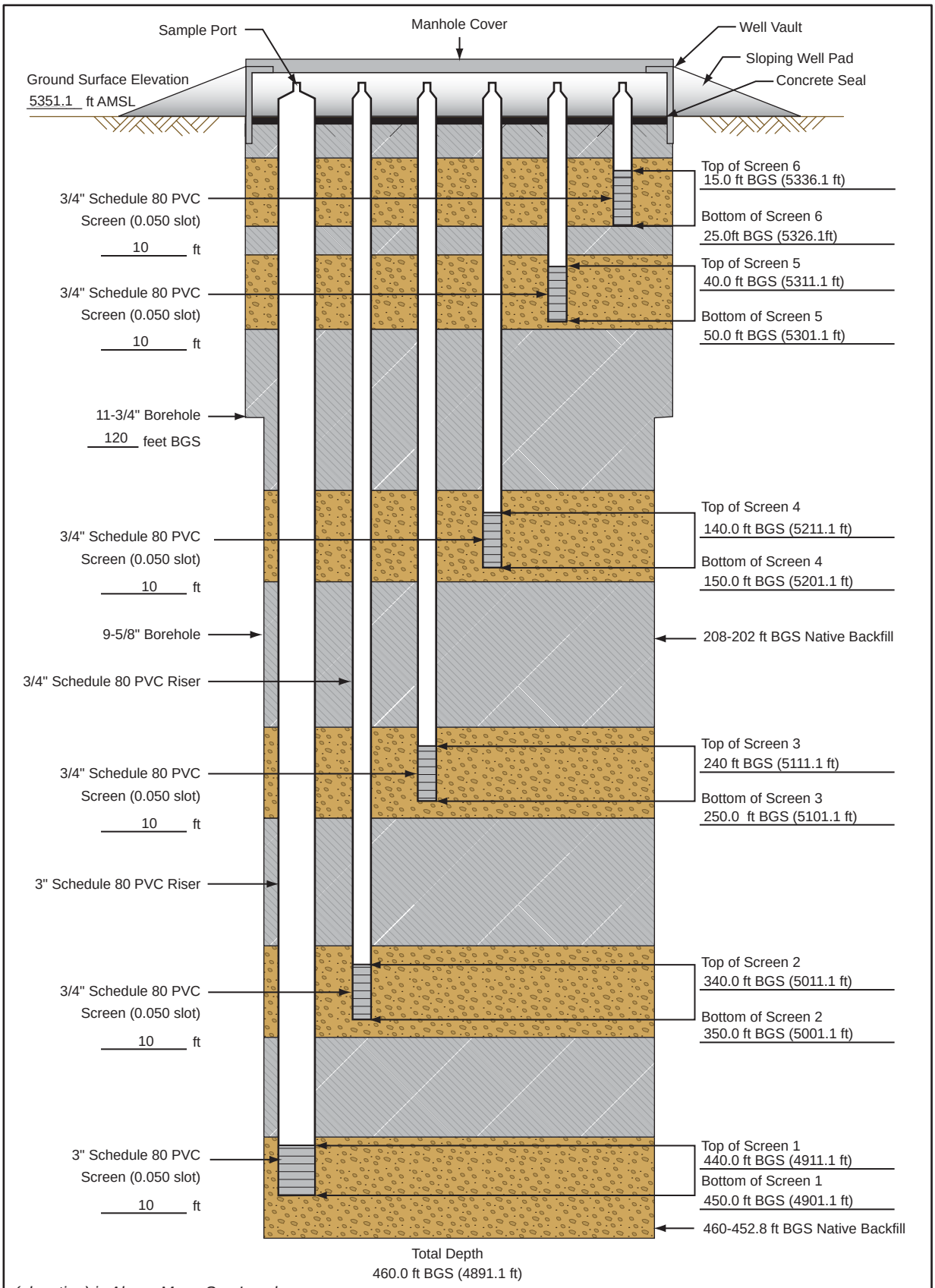
# Nested Soil Vapor Well Completion Diagram for KAFB-106135

Installation Start Date/Time: 2/3/2011 @ 12:30
Installation End Date/Time: 2/5/2011 @ 16:45



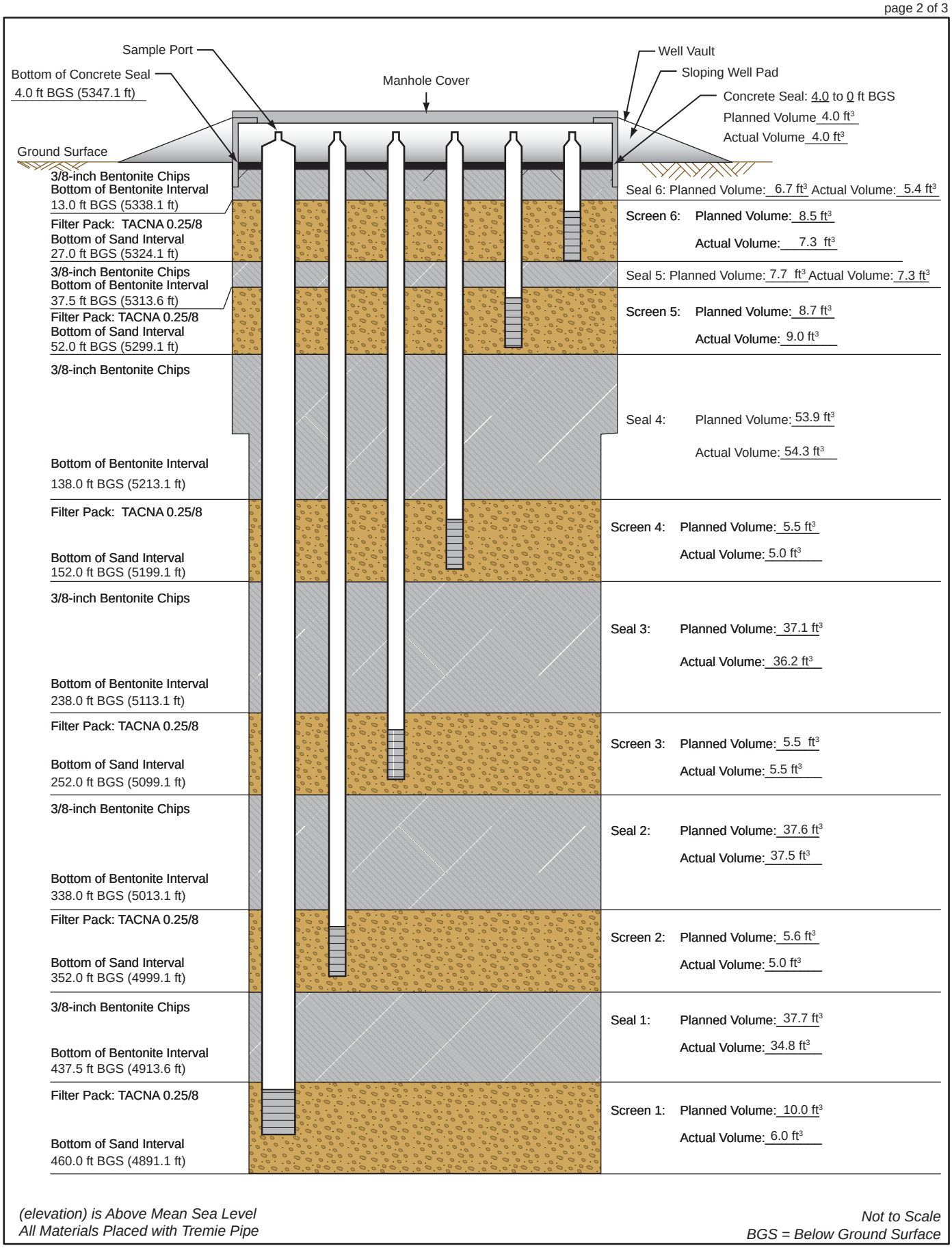



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106135






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

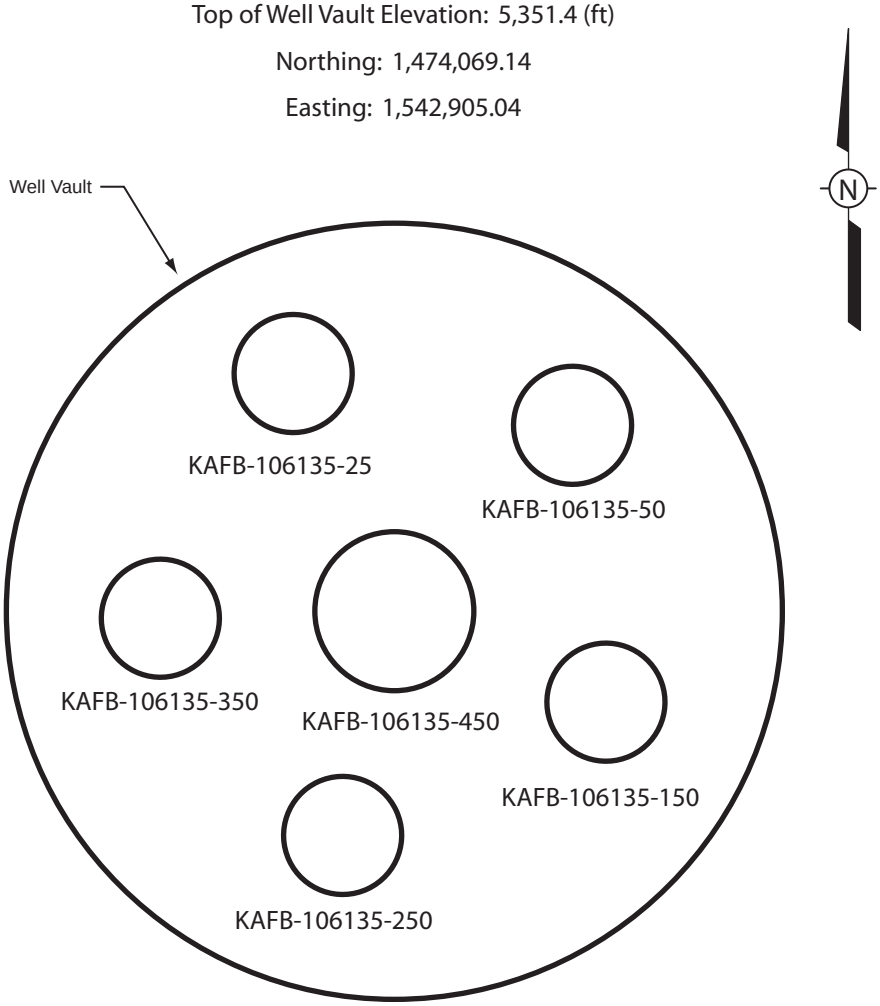
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106135



Top of Well Vault Elevation: 5,351.4 (ft)

Northing: 1,474,069.14

Easting: 1,542,905.04




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106135-25 | 3/4 | 25.0 | 15.0-25.0 | 1,474,068.94 | 1,542,905.05 | 5,350.9 |
| KAFB-106135-50 | 3/4 | 50.0 | 40.0-50.0 | 1,474,068.73 | 1,542,905.26 | 5,350.9 |
| KAFB-106135-150 | 3/4 | 150.0 | 140.0-150.0 | 1,474,068.42 | 1,542,905.12 | 5,350.9 |
| KAFB-106135-250 | 3/4 | 250.0 | 240.0-250.0 | 1,474,068.53 | 1,542,904.79 | 5,350.9 |
| KAFB-106135-350 | 3/4 | 350.0 | 340.0-350.0 | 1,474,068.83 | 1,542,904.80 | 5,350.9 |
| KAFB-106135-450 | 3 | 450.0 | 440.0-450.0 | 1,474,068.80 | 1,542,904.98 | 5,350.9 |

# Borehole ID: KAFB-106136

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/26/2011
Date TD Reached: 6/27/2011
Date Completed: 7/6/2011

Ground Elevation AMSL (ft): 5351.7
Y Coordinate: 1474677.86
X Coordinate: 1543099.41

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Sandy SILT (ML); light reddish brown (5YR 6/3); dry; medium stiff; 70% silt; trace clay; 30% very fine sand; trace fine sand; no odor. | ML | Concrete Seal | Hand augered.<br>***Note: no headspace requirement at this location*** |
| 5 | | | | | Same as above (0 ft); no odor. | | | Began drilling @ 1100 on 6/26/11. |
| 10 | | | | | Silty SAND (SM); light reddish brown (5YR 6/3); dry; medium dense; 75% very fine to fine sand; trace medium to coarse sand; subangular; 25% silt with minor clay; caliche nodules; no odor. | SM | Bentonite Seal<br>Top of Filter Pack | |
| 15 | | | | | Silty SAND (SM); reddish brown (5YR 5/4); dry; medium dense; 65% very fine to fine sand; trace medium sand; subangular; 35% silt with minor clay; caliche nodules; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 20 | | | | | SILT (ML); reddish brown (5YR 4/4); dry; medium stiff to stiff; 90% silt with minor clay; 10% very fine to fine sand; no odor. | ML | | Kelly down @ 1104. New 20' connection @ 1115. Resumed drilling @ 1115. |
| 25 | | | | | Same as above (17 ft); no odor. | | Bottom of Screen | |
| 30 | | | | | Sandy SILT (ML); light reddish brown (5YR 6/3); dry; stiff; 70% silt; trace clay; 30% very fine to fine sand; no odor. | | Bentonite Seal | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/3/11 15:43 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106136

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/26/2011
Date TD Reached: 6/27/2011
Date Completed: 7/6/2011

Ground Elevation AMSL (ft): 5351.7
Y Coordinate: 1474677.86
X Coordinate: 1543099.41

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Sandy SILT (ML); light reddish brown (5YR 6/3); dry; stiff; 70% silt; trace clay; 30% very fine to fine sand; no odor. | | Bentonite Seal | |
| 35 | | | | | SILT (ML); reddish brown (5YR 5/4); dry; stiff; 95% silt with minor clay; 5% very fine to fine sand; no odor. | | Top of Filter Pack | |
| 40 | | | | | Same as above (35 ft); no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1121. New 20' connection @ 1127. Resumed drilling @ 1128. |
| 45 | | | | | SILT with Sand (ML); reddish brown (5YR 5/4); dry; stiff; 85% silt; trace clay; 15% very fine sand; trace fine sand; no odor. | ML | | |
| 50 | | | | | Same as above (45 ft); light reddish brown (5YR 6/3); caliche nodules; no odor. | | Bottom of Screen | |
| 55 | | | | | Same as above (45 ft); red (2.5YR 4/6); 85% silt with minor clay; 15% very fine to fine sand; trace medium to coarse sand; subangular; no odor. | | Bentonite Seal | |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106136

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/26/2011
Date TD Reached: 6/27/2011
Date Completed: 7/6/2011

Ground Elevation AMSL (ft): 5351.7
Y Coordinate: 1474677.86
X Coordinate: 1543099.41

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT with Sand (ML); reddish brown (5YR 5/4); dry; stiff; 85% silt; trace clay; 15% very fine to fine sand; trace medium to coarse sand; subangular to subrounded; no odor. | | | Kelly down @ 1140. New 20' connection @ 1147. Resumed drilling @ 1148. |
| 65 | | | | | Same as above (60 ft); reddish brown (5YR 4/3); 75% silt; trace clay; 25% very fine to coarse sand; subangular; no odor. | ML | | |
| 70 | | | | | SILT (ML); reddish brown (5YR 5/4); dry; stiff; 90% silt; trace clay; 10% very fine to fine sand; no odor. | | | |
| 75 | | | | | SILT with Sand (ML); reddish brown (5YR 5/4); dry; stiff; 85% silt; trace clay; 15% very fine to coarse sand; subangular; no odor. | | Bentonite Seal | |
| 80 | | | | | Well graded SAND (SW); light reddish brown (5YR 6/3); dry; dense; 95% very fine to coarse sand; subangular; 5% silt; no odor. | SW | | Kelly down @ 1155. New 20' connection @ 1200. Resumed drilling @ 1252. |
| 85 | | | | | SILT (ML); reddish brown (5YR 5/4); dry; stiff; 95% silt; trace clay; 5% very fine sand; trace fine sand; no odor. | | | |
| 90 | | | | | Same as above (81 ft); no odor. | ML | | |

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# Borehole ID: KAFB-106136

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/26/2011
Date TD Reached: 6/27/2011
Date Completed: 7/6/2011

Ground Elevation AMSL (ft): 5351.7
Y Coordinate: 1474677.86
X Coordinate: 1543099.41

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); reddish brown (5YR 5/4); dry; stiff; 95% silt; trace clay; 5% very fine sand; trace fine sand; no odor. | | | |
| 95 | | | | | Same as above (90 ft); 100% silt with clay; trace very fine to fine sand; no odor. | | | |
| 100 | | | | | Same as above (90 ft); 90% silt; trace clay; 10% trace very fine to coarse sand; subangular; no odor. | ML | | Kelly down @ 1303. New 20' connection @ 1310. Resumed drilling @ 1310. |
| 105 | | | | | Same as above (90 ft). | | Bentonite Seal | |
| 110 | | | | | SILT with Sand (ML); light reddish brown (5YR 6/3); dry; stiff; 85% silt; trace clay; 15% very fine to coarse sand; subangular; no odor. | | | |
| 115 | | | | | Well graded SAND (SW); light reddish brown (5YR 6/3); dry; dense; 100% very fine to coarse sand; subangular; trace fine gravel to 7mm; subangular; no odor. | SW | | |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106136

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/26/2011
Date TD Reached: 6/27/2011
Date Completed: 7/6/2011

Ground Elevation AMSL (ft): 5351.7
Y Coordinate: 1474677.86
X Coordinate: 1543099.41

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Well graded SAND with Gravel (SW); light reddish brown (5YR 6/3); dry; dense; 85% very fine to coarse sand; subangular to subrounded; 15% fine gravel to 1.5cm; subangular; no odor. | SW | | Kelly down @ 1317. Total depth with 11-3/4" casing. New 20' connection @ 1633. Resumed drilling with 9-5/8" casing @ 1634. |
| | | | | | SILT (ML); light reddish brown (5YR 6/3); dry; stiff; 95% silt; trace clay; 5% very fine sand; trace fine sand; no odor. | | | |
| 125 | | | | | | | | |
| | | | | | | | Bentonite Seal | |
| 130 | | | | | Same as above (123 ft); 95% silt with clay nodules; 5% very fine sand; no odor. | | | |
| 135 | | | | | Same as above (123 ft); 95% silt; trace clay; 5% very fine to fine sand; trace medium sand; subangular; no odor. | ML | Top of Filter Pack | |
| 140 | | | | | SILT with Sand (ML); light reddish brown (5YR 6/3); dry; stiff; 85% silt; trace clay; 15% very fine to medium sand; trace coarse sand; subangular; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1640. New connection @ 1657. End of 6/26/11. Resumed drilling @ 0814 on 6/27/11. J. Tarbert (geologist) started logging. |
| 145 | | | | | Same as above (140 ft); brown (7.5YR 5/4). | | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106136

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/26/2011
Date TD Reached: 6/27/2011
Date Completed: 7/6/2011

Ground Elevation AMSL (ft): 5351.7
Y Coordinate: 1474677.86
X Coordinate: 1543099.41

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | SILT with Sand (ML); light reddish brown (5YR 6/3); dry; stiff; 80% silt; 5% clay; 15% very fine to medium sand; trace coarse sand; subangular; caliche nodules; no odor. | | Bottom of Screen | |
| 155 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; stiff; low plasticity; 85% silt; 15% very fine sand to 0.1mm. | | | New 20' connection @ 0825. Resumed drilling @ 0829. |
| 160 | | | | | Same as above (155 ft). | ML | | |
| 165 | | | | | SILT with Sand (ML); strong brown (7.5YR 5/6); dry; stiff; low plasticity; 80% silt; 20% very fine to medium sand to 1mm. | | Bentonite Seal | |
| 170 | | | | | Same as above (165 ft); trace coarse sand to 4mm. | | | |
| 175 | | | | | Well graded SAND (SW); brown (7.5YR 5/4); moist; loose; 95% very fine to very coarse sand; trace fine gravel to 7mm; subrounded; 5% silt. | SW | | New 20' connection @ 0839. Resumed drilling @ 0843. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106136

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/26/2011
Date TD Reached: 6/27/2011
Date Completed: 7/6/2011

Ground Elevation AMSL (ft): 5351.7
Y Coordinate: 1474677.86
X Coordinate: 1543099.41

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND (SW); brown (7.5YR 5/4); moist; loose; 95% very fine to very coarse sand; trace fine gravel to 7mm; subrounded; 5% silt. | SW | | |
| | | | | | SILT with Sand (ML); lense. | ML | | |
| 185 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 95% very fine to very coarse sand; 5% fine gravel to 1cm; rounded. | | | |
| 190 | | | | | Same as above (184 ft). | | | |
| 195 | | | | | Same as above (184 ft); trace fine gravel. | SW | Bentonite Seal | New 20' connection @ 0849. Resumed drilling @ 0854. |
| 200 | | | | | Same as above (184 ft); trace fine gravel. | | | |
| 205 | | | | | Same as above (184 ft). | | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106136

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/26/2011
Date TD Reached: 6/27/2011
Date Completed: 7/6/2011

Ground Elevation AMSL (ft): 5351.7
Y Coordinate: 1474677.86
X Coordinate: 1543099.41

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 95% very fine to very coarse sand; 5% gravel to 1cm; rounded. | SW | | |
| 215 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); dry; loose; 100% very fine to medium sand to1mm; subrounded. | SP | | New 20' connection @ 0858. Resumed drilling @ 0904. |
| 220 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 90% very fine to very coarse sand; 10% fine gravel to 1.6cm; rounded. | SW | Bentonite Seal | |
| 225 | | | | | Same as above (219 ft); dry; 5% fine gravel. | | | |
| 230 | | | | | Same as above (219 ft); dry. | | | |
| 235 | | | | | Same as above (219 ft); very moist. | | Top of Filter Pack | New 20' connection @ 0910. Resumed drilling @ 0918. |
| 240 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/3/11 15:43 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106136

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/26/2011
Date TD Reached: 6/27/2011
Date Completed: 7/6/2011

Ground Elevation AMSL (ft): 5351.7
Y Coordinate: 1474677.86
X Coordinate: 1543099.41

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% very fine to very coarse sand. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 245 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 90% very fine to very coarse sand; 10% fine gravel to 1.6cm; rounded. | | | |
| 250 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; loose; 100% fine to medium sand to 2mm; subrounded. | SP | Bottom of Screen | |
| 255 | | | | | Same as above (250 ft); 100% very fine to medium sand. | | | New 20' connection and resumed drilling @ 0923. |
| 260 | | | | | No cuttings returned. | | Bentonite Seal | |
| 265 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 90% very fine to very coarse sand; 10% fine gravel to 1.3cm; subrounded. | SW | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106136

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/26/2011
Date TD Reached: 6/27/2011
Date Completed: 7/6/2011

Ground Elevation AMSL (ft): 5351.7
Y Coordinate: 1474677.86
X Coordinate: 1543099.41

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 90% very fine to very coarse sand; 10% fine gravel to 1.3cm; subrounded. | SW | | |
| 275 | | | | | Poorly graded SAND (SP); light brownish gray (10YR 6/2); dry; loose; 100% fine to medium sand to 1mm; subrounded; trace silt and clay. | SP | | New 20' connection @ 0934. Resumed drilling @ 0939. |
| 280 | | | | | Same as above (273 ft). | | | |
| 285 | | | | | SILT with Sand (ML); yellowish brown (10YR 5/4); dry; stiff; low plasticity; 80% silt; 20% very fine to fine sand to 0.5mm; subrounded. | ML | Bentonite Seal | |
| 290 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% fine to very coarse sand; trace fine gravel to 8mm; rounded. | SW | | |
| | | | | | Same as above (287 ft). | | | |
| 295 | | | | | Same as above (287 ft); 5% fine gravel. | | | New 20' connection @ 0947. Resumed drilling @ 1006. |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/3/11 15:43 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106136

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/26/2011
Date TD Reached: 6/27/2011
Date Completed: 7/6/2011

Ground Elevation AMSL (ft): 5351.7
Y Coordinate: 1474677.86
X Coordinate: 1543099.41

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Sandy SILT (ML); yellowish brown (10YR 5/4); moist; stiff; low plasticity; 65% silt; 30% fine to coarse sand; 5% fine gravel to 1.6cm. | | | |
| 305 | | | | | SILT with Sand (ML); yellowish brown (10YR 5/4); moist; stiff; low plasticity; 85% silt; 15% fine to coarse sand. | ML | | |
| 310 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; medium dense; 100% very fine to medium sand to 2mm; subrounded; trace silt and clay. | SP | | |
| 315 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 5/3); dry; medium dense; 60% fine gravel to 2.1cm; rounded; 40% very fine to very coarse sand; subangular to subrounded. Note: some granitic fragments. | GP | Bentonite Seal | New 20' connection @ 1017. Resumed drilling @ 1022. |
| 320 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); dry; medium dense; 70% fine to very coarse sand; 30% fine gravel to 3.1cm; subangular to subrounded. | | | |
| 325 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; medium dense; 100% fine to very coarse sand; trace fine gravel; subangular to subrounded. | SW | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/3/11 15:43 - X:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106136

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/26/2011
Date TD Reached: 6/27/2011
Date Completed: 7/6/2011

Ground Elevation AMSL (ft): 5351.7
Y Coordinate: 1474677.86
X Coordinate: 1543099.41

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Poorly graded SAND (SP); light yellowish brown (10YR 6/4); dry; medium dense; 100% fine to medium sand; trace fine gravel to 3cm; rounded. | | Bentonite Seal | |
| 335 | | | | | Same as above (330 ft); 5% gravel. | SP | Top of Filter Pack | New 20' connection @ 1029. Resumed drilling @ 1035. |
| 340 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 5/3); dry; medium dense; 60% fine gravel to 2.8cm; 40% very fine to very coarse sand; subrounded. Note: granitic fragments. | GP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 345 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; medium dense; 100% fine to medium sand; trace fine gravel to 2.9cm; subrounded. | SP | | |
| 350 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; medium dense; 95% fine to very coarse sand; 5% fine gravel to 2.2cm; rounded. | | Bottom of Screen | |
| 355 | | | | | Same as above (350 ft); grading finer. | SW | Bentonite Seal | New 20' connection @ 1042. Resumed drilling @ 1047. |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106136

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/26/2011
Date TD Reached: 6/27/2011
Date Completed: 7/6/2011

Ground Elevation AMSL (ft): 5351.7
Y Coordinate: 1474677.86
X Coordinate: 1543099.41

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; medium dense; 95% fine to very coarse sand; 5% fine gravel to 2.2cm; rounded. | | | |
| 365 | | | | | Same as above (360 ft). | SW | | |
| 370 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; medium dense; 100% very fine to fine sand to 0.5mm; rounded. | | | |
| 375 | | | | | Same as above (370 ft); 100% fine to medium sand; trace fine gravel to 1cm. | SP | Bentonite Seal | New 20' connection and resumed drilling @ 1059. |
| 380 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; medium dense; 90% fine to very coarse sand; 10% fine gravel to 3cm; rounded. | | | |
| 385 | | | | | Same as above (380 ft). | SW | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106136

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/26/2011
Date TD Reached: 6/27/2011
Date Completed: 7/6/2011

Ground Elevation AMSL (ft): 5351.7
Y Coordinate: 1474677.86
X Coordinate: 1543099.41

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; medium dense; 90% fine to very coarse sand; 10% fine gravel to 3cm; rounded; grading coarser than 385'. | | | |
| 395 | | | | | Same as above (390 ft). | SW | | New 20' connection @ 1107. Resumed drilling @ 1113. |
| 400 | | | | | Poorly graded GRAVEL (GP); gravel to 3cm; lense. | GP | | |
| | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; medium dense; 95% fine to very coarse sand; 5% fine gravel to 3cm; rounded. | | | |
| 405 | | | | | Same as above (401 ft); no gravel. | | Bentonite Seal | |
| 410 | | | | | Same as above (401 ft). | SW | | |
| 415 | | | | | Same as above (401 ft). | | | New 20' connection @ 1126. Resumed drilling @ 1235. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106136

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/26/2011
Date TD Reached: 6/27/2011
Date Completed: 7/6/2011

Ground Elevation AMSL (ft): 5351.7
Y Coordinate: 1474677.86
X Coordinate: 1543099.41

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; medium dense; 100% fine to very coarse sand. | SW | | |
| 425 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; medium dense; 100% very fine to medium sand to 2mm; rounded; trace clay. | | Bentonite Seal | |
| 430 | | | | | Same as above (425 ft); trace coarse sand; trace fine gravel to 2cm. | | | |
| 435 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); dry; dense; 100% very fine to fine sand to 0.5mm; rounded. | SP | Top of Filter Pack | New 20' connection @ 1246. Resumed drilling @ 1252. |
| 440 | | | | | Same as above (435 ft). | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 445 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% very fine to coarse sand to 3mm; rounded. | SW | | |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106136

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 6/26/2011
Date TD Reached: 6/27/2011
Date Completed: 7/6/2011

Ground Elevation AMSL (ft): 5351.7
Y Coordinate: 1474677.86
X Coordinate: 1543099.41

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% very fine to coarse sand to 3mm; rounded. | SW | Bottom of Screen | |
| 455 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% very fine to medium sand to 1mm; rounded. | SP | Bottom of Filter Pack<br>Native Backfill | |
| 460 | | | | | | | | Total Depth = 460 ft. Reached @ 1301 on 6/27/11. |
| 465 | | | | | | | | Water added during drilling (gallons) = 0 |
| 470 | | | | | | | | Water added after drilling (gallons) = 0 |
| 475 | | | | | | | | Water added during construction (gallons) = Not Recorded |
| 480 | | | | | | | | Kelly down: TD the joint and ready to make new connection. |

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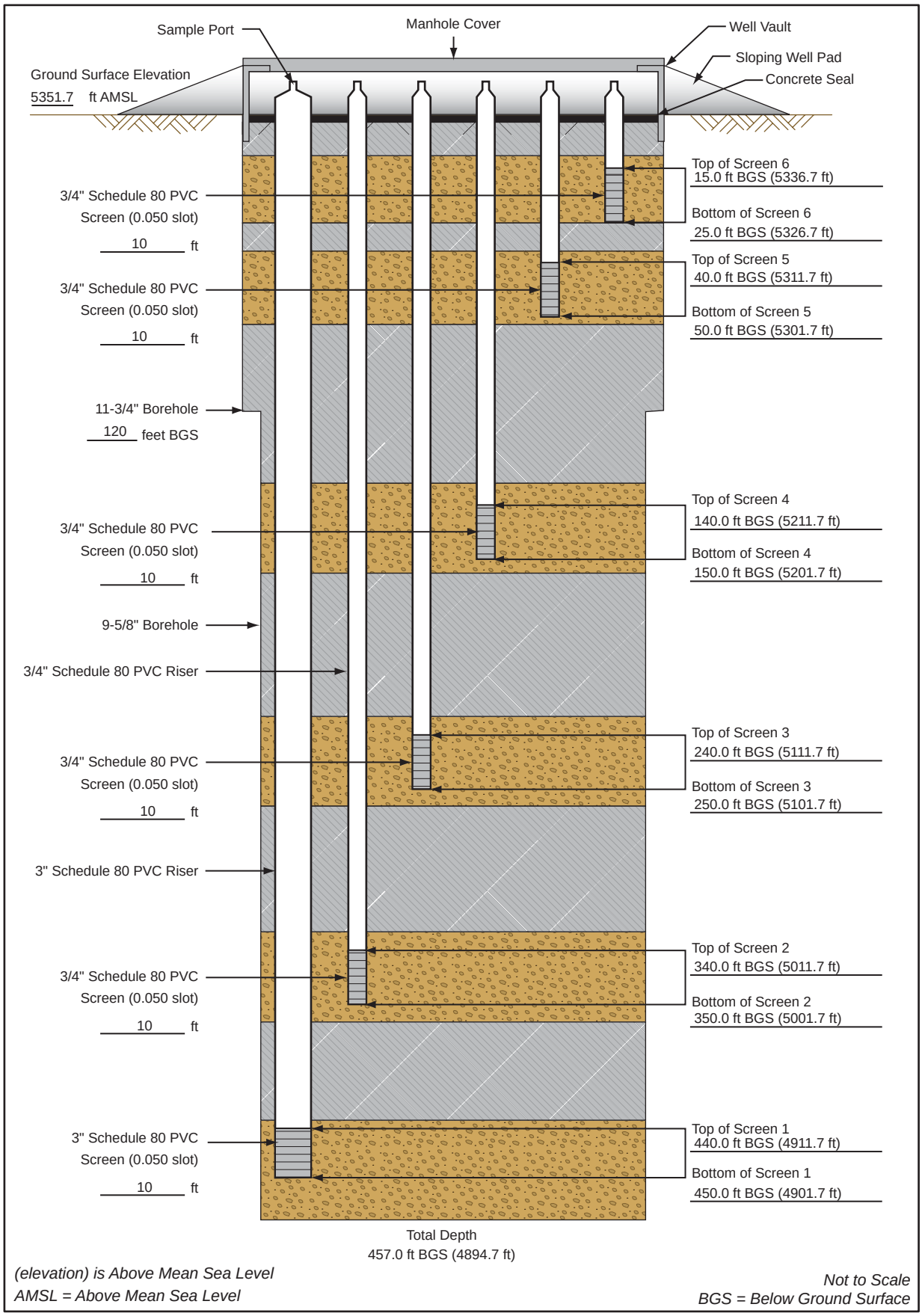
# Nested Soil Vapor Well Completion Diagram for KAFB-106136

Installation Start Date/Time: 6/28/2011 @ 09:22
Installation End Date/Time: 7/06/2011 @ 16:55



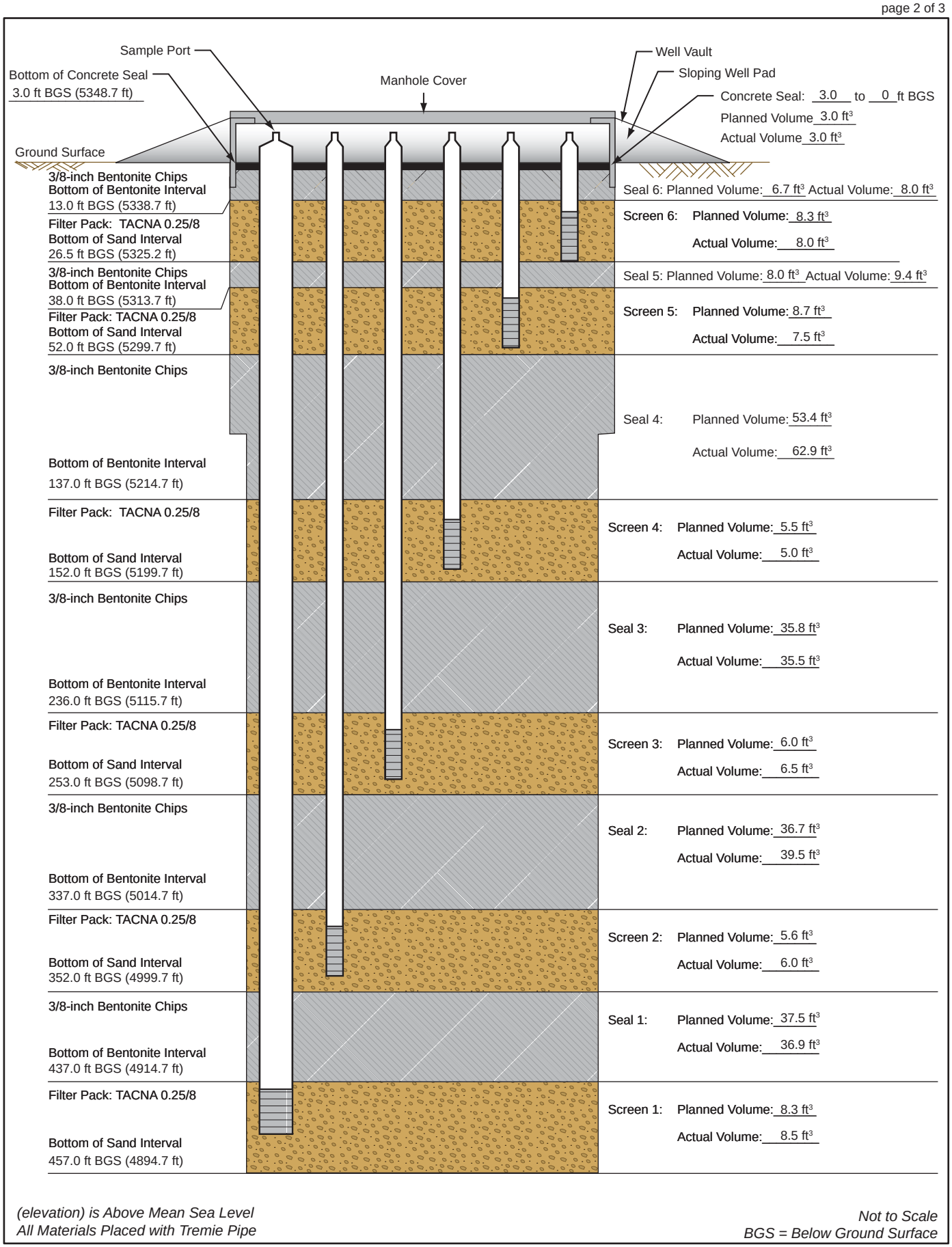



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106136






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

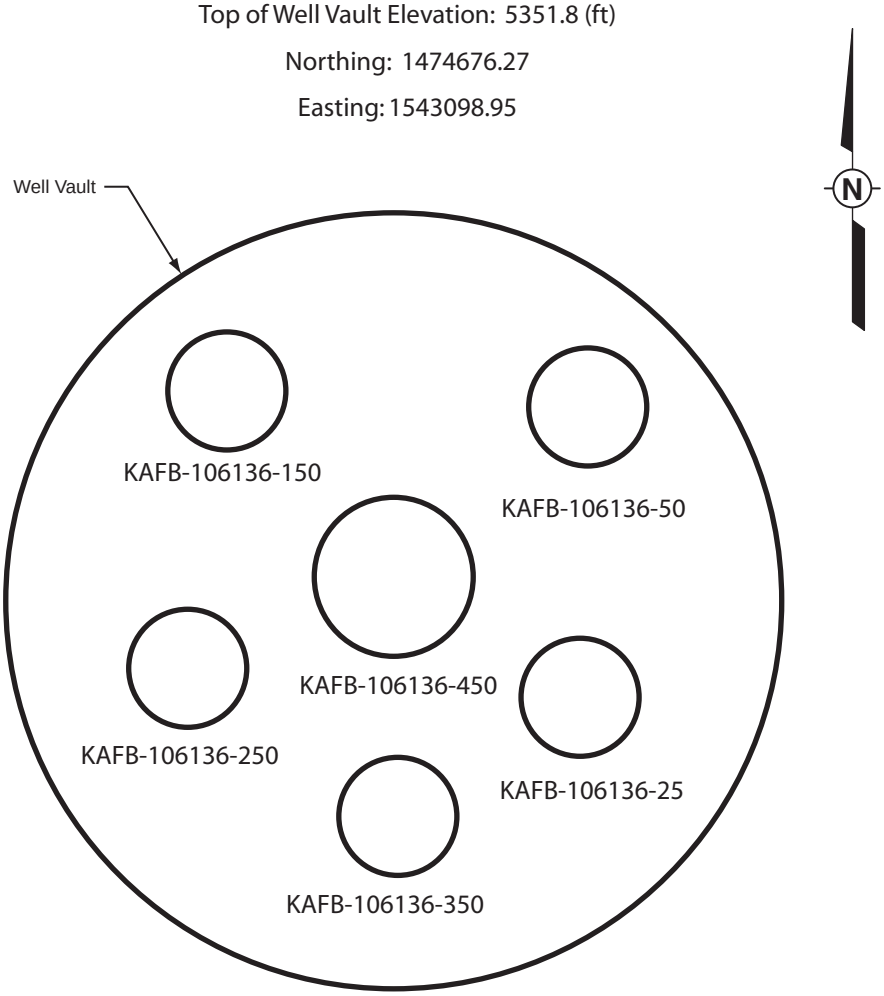
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106136



Top of Well Vault Elevation: 5351.8 (ft)

Northing: 1474676.27

Easting: 1543098.95




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106136-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1474675.71 | 1543098.95 | 5351.2 |
| KAFB-106136-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1474676.02 | 1543098.89 | 5351.1 |
| KAFB-106136-150 | 3/4 | 150.0 | 140.0 - 150.0 | 1474676.04 | 1543098.59 | 5351.1 |
| KAFB-106136-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1474675.79 | 1543098.45 | 5351.1 |
| KAFB-106136-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1474675.54 | 1543098.68 | 5351.2 |
| KAFB-106136-450 | 3 | 450.0 | 440.0 - 450.0 | 1474675.92 | 1543098.75 | 5351.3 |

# Borehole ID: KAFB-106137

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 1/19/2011
Date Completed: 1/25/2011

Ground Elevation AMSL (ft): 5347.3
Y Coordinate: 1474079.39
X Coordinate: 1542321.46

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | No description recorded. | | Concrete Seal | Hand augered. ***Note: no headspace requirement at this location*** |
| 5 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; very soft; low plasticity; 80% silt; 15% fine sand; 5% fine gravel to 1.4cm. | | Bentonite Seal | Began drilling @ 1212 on 1/18/11. |
| 10 | | | | | Same as above (5 ft). | | Top of Filter Pack | |
| 15 | | | | | Same as above (5 ft); 7% gravel. | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 20 | | | | | Same as above (15 ft). | | | |
| 25 | | | | | Same as above (15 ft). | | Bottom of Screen | |
| 30 | | | | | | | Bentonite Seal | |

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# Borehole ID: KAFB-106137

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 1/19/2011
Date Completed: 1/25/2011

Ground Elevation AMSL (ft): 5347.3
Y Coordinate: 1474079.39
X Coordinate: 1542321.46

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT with Sand (ML); brown (7.5YR 4/4); dry; very soft; low plasticity; 85% silt; 10% very fine sand; 5% coarse sand to 4mm. | | Bentonite Seal | |
| 35 | | | | | Same as above (30 ft); no coarse sand; trace fine gravel to 1.5cm; trace clay nodules. | | Top of Filter Pack | |
| 40 | | | | | Same as above (30 ft). | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 45 | | | | | Same as above (30 ft). | ML | | |
| 50 | | | | | Gravelly SILT (ML); brown (7.5YR 5/4); dry; very soft; nonplastic; 70% silt; 30% fine gravel to 1.2 cm. | | Bottom of Screen | |
| 55 | | | | | Same as above (50 ft). | | Bentonite Seal | |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106137

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 1/19/2011
Date Completed: 1/25/2011

Ground Elevation AMSL (ft): 5347.3
Y Coordinate: 1474079.39
X Coordinate: 1542321.46

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT with Sand (ML); brown (7.5YR 4/4); dry; very soft; low plasticity; 85% silt; 10% very fine sand; 5% coarse sand to 4mm. | ML | Bentonite Seal | |
| 65 | | | | | Same as above (60 ft). | | | |
| 70 | | | | | Same as above (60 ft); trace fine gravel to 8 mm. | | | |
| 75 | | | | | Same as above (60 ft); 80% silt; 10% very fine sand; 10% coarse sand; trace gravel to 9mm. | | | |
| 80 | | | | | SILT (ML); brown (7.5YR 4/4); dry; soft; medium plasticity; 80% silt; 15% clay; 5% very fine sand; trace coarse sand to 2mm. | | | |
| 85 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; very soft; low plasticity; 70% silt; 5% clay nodules; 15% very fine sand; 10% coarse sand to 3mm. | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106137

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 1/19/2011
Date Completed: 1/25/2011

Ground Elevation AMSL (ft): 5347.3
Y Coordinate: 1474079.39
X Coordinate: 1542321.46

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; very soft; low plasticity; 75% silt; 15% very fine sand; 10% coarse sand to 3mm. | | Bentonite Seal | |
| 95 | | | | | Same as above (90 ft). | ML | | |
| 100 | | | | | SILT with Sand (ML); brown (7.5YR 4/4); moist; soft; medium plasticity; 65% silt; 10% clay; 20% very fine sand; 5% coarse sand to 3mm. | | | |
| 105 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; very loose; 90% medium sand; 5% coarse sand to 2mm; subangular; 5% fine sand. | | Native Backfill | |
| 110 | | | | | Same as above (105 ft); trace gravel to 1.7cm. | SP | | |
| 115 | | | | | Sandy SILT (ML); brown (7.5YR 4/4); dry; very soft; low plasticity; 70% silt; 25% fine sand; 5% coarse sand to 5mm. | ML | Bentonite Seal | |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106137

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 1/19/2011
Date Completed: 1/25/2011

Ground Elevation AMSL (ft): 5347.3
Y Coordinate: 1474079.39
X Coordinate: 1542321.46

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); moist; soft; medium plasticity; 60% silt; 20% clay; 15% very fine sand; 5% coarse sand to 5mm. | ML | | Reached 120' with 11-3/4" casing @1346. |
| 125 | | | | | Silty SAND (SM); brown (7.5YR 5/4); moist; loose; 60% very fine sand to 0.04mm; rounded; 40% silt; trace clay nodules. | SM | Bentonite Seal | Began drilling on 1/19/11 @ 1000. |
| 130 | | | | | Sandy SILT (ML); brown (7.5YR 4/4); moist; soft; low plasticity; 70% silt; 20% very fine sand; 10% medium sand; trace coarse sand to 4mm. | ML | | |
| 135 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; very loose; 100% very fine to coarse sand to 5mm; subangular. | SW | Top of Filter Pack | |
| 140 | | | | | SILT (ML); pale brown (10YR 6/3); moist; firm; medium plasticity; 60% silt; 35% clay; 5% very fine sand to 0.04mm. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 145 | | | | | SILT with Sand (ML); yellowish brown (10YR 5/4); dry; very soft; low plasticity; 85% silt; 10% very fine sand; 5% coarse sand to 3mm. | ML | | |
| 150 | | | | | | | | |

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**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
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Date Started: 1/18/2011
Date TD Reached: 1/19/2011
Date Completed: 1/25/2011

Ground Elevation AMSL (ft): 5347.3
Y Coordinate: 1474079.39
X Coordinate: 1542321.46

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | SILT with Sand (ML); yellowish brown (10YR 5/4); moist; very soft; low plasticity; 85% silt; 10% very fine sand; 5% coarse sand to 3mm. | | Bottom of Screen | |
| 155 | | | | | SILT (ML); brown (7.5YR 5/4); moist; soft; medium plasticity; 70% silt; 25% clay; 5% very fine sand to 0.04mm. | ML | | |
| 160 | | | | | Silty SAND (SM); dark yellowish brown; dry; very loose; 80% medium sand to 0.4mm; subangular; 20% silt. | SM | | |
| 165 | | | | | Well graded SAND with Silt (SW-SM); brown (10YR 5/3); moist; very loose; 80% fine to coarse sand; 10% fine gravel to 1cm; subrounded; 10% silt. | SW-SM | Bentonite Seal | |
| 170 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); dry; very loose; 90% fine to medium sand; 10% coarse sand to 2mm; subrounded. | | | |
| 175 | | | | | Same as above (170 ft); moist. | SW | | |
| 180 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/21/11 15:45 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106137

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 1/19/2011
Date Completed: 1/25/2011

Ground Elevation AMSL (ft): 5347.3
Y Coordinate: 1474079.39
X Coordinate: 1542321.46

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); dry; very loose; 90% fine to medium sand; 10% coarse sand to 2mm; subrounded. | | | |
| 185 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 90% fine to medium sand; 10% coarse sand to 2mm; rounded. | | | |
| 190 | | | | | Same as above (185 ft); 15% coarse sand; trace fine gravel to 1.1cm. | SW | | |
| 195 | | | | | Same as above (185 ft). | | Bentonite Seal | |
| 200 | | | | | Same as above (185 ft). | | | |
| 205 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); moist; very loose; 70% medium sand; 20% fine sand; 10% coarse sand to 3mm; rounded. | SP | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106137

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 1/19/2011
Date Completed: 1/25/2011

Ground Elevation AMSL (ft): 5347.3
Y Coordinate: 1474079.39
X Coordinate: 1542321.46

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); moist; very loose; 70% medium sand; 20% fine sand; 10% coarse sand to 3mm; rounded. | | | |
| 215 | | | | | Same as above (210 ft); dry; 70% medium sand; 30% very fine sand. | SP | | |
| 220 | | | | | Same as above (210 ft). | | Bentonite Seal | |
| 225 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); moist; loose; 95% very fine to very coarse sand; 5% fine gravel to 1.3cm; rounded. | | | |
| 230 | | | | | Same as above (225 ft); 10% fine gravel. | SW | | |
| 235 | | | | | Same as above (225 ft). | | | |
| 240 | | | | | | | Top of Filter Pack | |

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# Borehole ID: KAFB-106137

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 1/19/2011
Date Completed: 1/25/2011

Ground Elevation AMSL (ft): 5347.3
Y Coordinate: 1474079.39
X Coordinate: 1542321.46

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); moist; loose; 95% very fine to very coarse sand; 5% fine gravel to 1.3cm; rounded; less coarse sand. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 245 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); moist; loose; 90% very fine to coarse sand; 10% fine gravel to 1.3cm; rounded. | | | |
| 250 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); moist; loose; 85% fine to very coarse sand; 15% fine gravel to 2.3cm; well rounded. | | Bottom of Screen | |
| 255 | | | | | Well graded SAND (SW); brown (10YR 4/3); moist; loose; 90% fine to very coarse sand; 5% fine gravel to 1.8cm; well rounded. | | | |
| 260 | | | | | SILT (ML); brown (10YR 5/3); damp; soft; medium plasticity; 60% silt; 30% clay; 10% very fine sand; trace medium gravel to 3.5cm. | ML | Bentonite Seal | |
| 265 | | | | | Silty SAND (SM); brown (10YR 5/3); moist; loose; 80% fine sand; 20% silt; trace fine gravel to 8mm; rounded; 20% silt. | SM | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106137

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 1/19/2011
Date Completed: 1/25/2011

Ground Elevation AMSL (ft): 5347.3
Y Coordinate: 1474079.39
X Coordinate: 1542321.46

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | SILT (ML); brown (10YR 4/3); dry to moist; soft; medium plasticity; 60% silt; 40% clay. | | | |
| 275 | | | | | SILT (ML); yellowish brown (10YR 5/4); moist; soft; medium plasticity; 80% silt; 10% clay; 10% coarse sand to 1mm. | ML | | |
| 280 | | | | | SILT (ML); brown (10YR 4/3); dry to moist; soft; medium plasticity; 60% silt; 40% clay. | | | |
| | | | | | Silty SAND (SM); dark yellowish brown (10YR 4/4); moist; very loose; 80% very fine to very coarse sand to 4mm; subrounded; 15% silt; 5% clay nodules. | SM | | |
| 285 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); moist; loose; 95% fine sand to 0.04mm; rounded; 5% silt. | | Bentonite Seal | |
| 290 | | | | | Same as above (284 ft); slightly coarser. | SP | | |
| 295 | | | | | Same as above (284 ft); dry to moist. | | | |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106137

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 1/19/2011
Date Completed: 1/25/2011

Ground Elevation AMSL (ft): 5347.3
Y Coordinate: 1474079.39
X Coordinate: 1542321.46

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); moist; loose; 95% medium sand to 0.04mm; rounded; 5% silt. | SP | | |
| 305 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; very loose; 100% fine to very coarse sand; trace fine gravel to 7mm; subrounded. | SW | | |
| 310 | | | | | Same as above (305 ft). | | | |
| 315 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; very loose; 85% fine to very coarse sand; 15% fine gravel; subrounded. | | Bentonite Seal | |
| 320 | | | | | Well graded SAND with Silt and Gravel (SW-SM); dark yellowish brown (10YR 4/6); dry; very loose; 70% fine to very coarse sand; 20% fine to medium gravel to 3.2cm; well rounded; 10% silt. | SW-SM | | |
| 325 | | | | | Same as above (320 ft). | | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106137

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 1/19/2011
Date Completed: 1/25/2011

Ground Elevation AMSL (ft): 5347.3
Y Coordinate: 1474079.39
X Coordinate: 1542321.46

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | | | | |
| 335 | | | | | Poorly graded GRAVEL with Sand (GP); dark yellowish brown (10YR 4/4); dry; very loose; 80% fine to medium gravel to 4cm; 20% medium to coarse sand; well rounded. | GP | Bentonite Seal | |
| 340 | | | | | No cuttings returned. | | Top of Filter Pack | Driller added ~20 gallons of water. No cuttings returned @ 335 ft. |
| 345 | | | | | Poorly graded SAND with Gravel (SP); dark yellow brown (10YR 4/4); dry; very loose; 70% medium to very coarse sand; 30% fine gravel to 8mm; rounded. | SP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Stopped to fix rubber on top of hammer to keep cuttings from blowing out @ 1300. Resumed drilling @ 1332. |
| 350 | | | | | Poorly graded SAND with Silt (SP-SM); brown (10YR 4/3); wet; loose; 90% medium sand to 0.4mm; rounded; 10% silt. | SP-SM | | |
| 355 | | | | | Same as above (345 ft); dry to moist. | | Bottom of Screen | |
| 360 | | | | | Poorly graded SAND (SP); grayish brown (10YR 5/2); dry; very loose; 90% medium sand; 10% coarse sand to 2mm; subrounded; trace fines. | SP | Bentonite Seal | |

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# Borehole ID: KAFB-106137

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 1/19/2011
Date Completed: 1/25/2011

Ground Elevation AMSL (ft): 5347.3
Y Coordinate: 1474079.39
X Coordinate: 1542321.46

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; very loose; 95% fine to very coarse sand to 3mm; subrounded; 5% silt. | SW | Bentonite Seal | |
| 365 | | | | | Same as above (360 ft); 5% fine gravel to 1cm; overall slightly coarser. | SW | Native Backfill | |
| 370 | | | | | Same as above (360 ft). | SW | Bentonite Seal | |
| 375 | | | | | Poorly graded SAND with Gravel (SP); dark yellowish brown (10YR 4/4); moist; very loose; 80% medium sand; 5% fine sand; 15% fine gravel to 1.7cm; well rounded. | SP | | |
| 380 | | | | | Same as above (375 ft); 90% medium sand; 5% gravel. | SP | Native Backfill | |
| 385 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); moist; very loose; 85% fine to very coarse sand; 15% fine gravel to 1cm; subrounded. | SW | Bentonite Seal | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106137

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 1/19/2011
Date Completed: 1/25/2011

Ground Elevation AMSL (ft): 5347.3
Y Coordinate: 1474079.39
X Coordinate: 1542321.46

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; very loose; 100% fine to very coarse sand; subrounded. | | | |
| 395 | | | | | Same as above (390 ft); trace gravel. | SW | Bentonite Seal | |
| 400 | | | | | Same as above (390 ft); trace gravel. | | Native Backfill | |
| 405 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); moist; very loose; 90% medium sand; 5% fine sand; 5% coarse sand; trace fine gravel to 8mm; subangular. | | | |
| 410 | | | | | Same as above (405 ft); dry. | SP | | |
| 415 | | | | | Same as above (405 ft); dry. | | Bentonite Seal | |
| 420 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/21/11 15:45 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106137

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 1/19/2011
Date Completed: 1/25/2011

Ground Elevation AMSL (ft): 5347.3
Y Coordinate: 1474079.39
X Coordinate: 1542321.46

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND with Silt (SP-SM); yellowish brown (10YR 5/4); moist; loose; 80% medium sand; 10% fine gravel to 2cm; rounded; 10% silt. | SP-SM | | |
| 425 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; very loose; 95% medium sand to 0.4mm; rounded; 5% fines. | SP | Bentonite Seal | |
| 430 | | | | | Same as above (425 ft). | | | |
| 435 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; very loose; 95% fine to very coarse sand; 5% fine gravel to 1.1cm; subangular. | SW | Top of Filter Pack | |
| 440 | | | | | Same as above (435 ft). | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 445 | | | | | Same as above (435 ft); slightly coarser. | | | |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106137

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/18/2011
Date TD Reached: 1/19/2011
Date Completed: 1/25/2011

Ground Elevation AMSL (ft): 5347.3
Y Coordinate: 1474079.39
X Coordinate: 1542321.46

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | |
| | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; very loose; 95% fine to very coarse sand; 5% fine gravel to 1.1cm; subangular. | SW | Bottom of Screen | |
| 455 | | | | | | | | |
| | | | | | Well graded GRAVEL with Silt and Sand (GW-GM); yellowish brown (10YR 5/4); moist; very loose; 60% fine gravel to 2.6cm; well rounded; 30% medium to coarse sand; 10% silt; trace clay nodules. | GW-GM | | |
| 460 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; loose; 70% medium sand; 20% coarse sand to 1mm; rounded; 10% fine sand. | SP | | Total Depth = 460 ft. Reached @ 1510 on 1/25/11.<br><br>Water added during drilling (gallons) = 20<br><br>Water added during construction (gallons) = Not Recorded |
| 465 | | | | | | | | |
| 470 | | | | | | | | |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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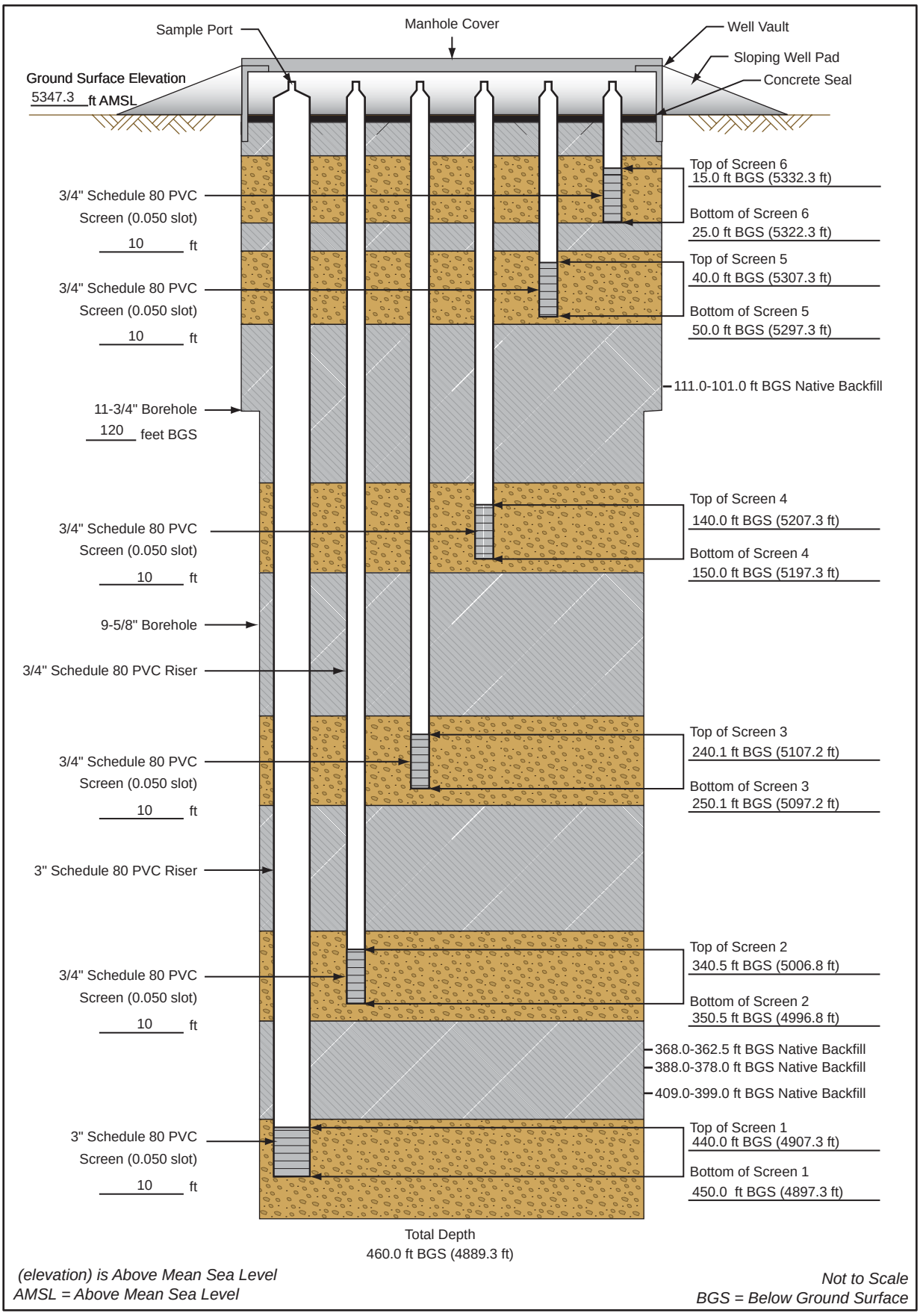
# Nested Soil Vapor Well Completion Diagram for KAFB-106137

Installation Start Date/Time: 1/20/2011 @ 08:00
Installation End Date/Time: 1/22/2011 @ 11:37



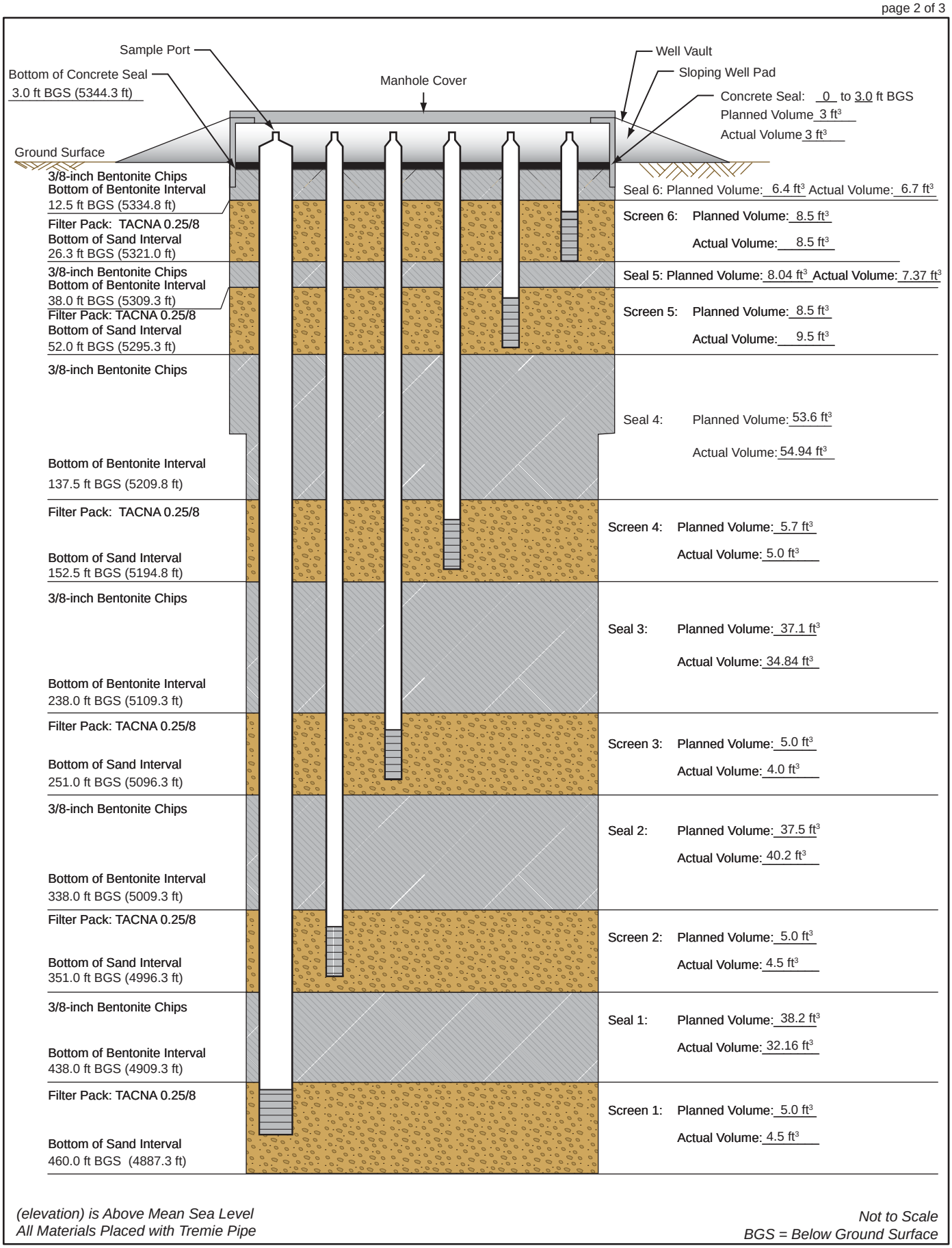



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106137






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

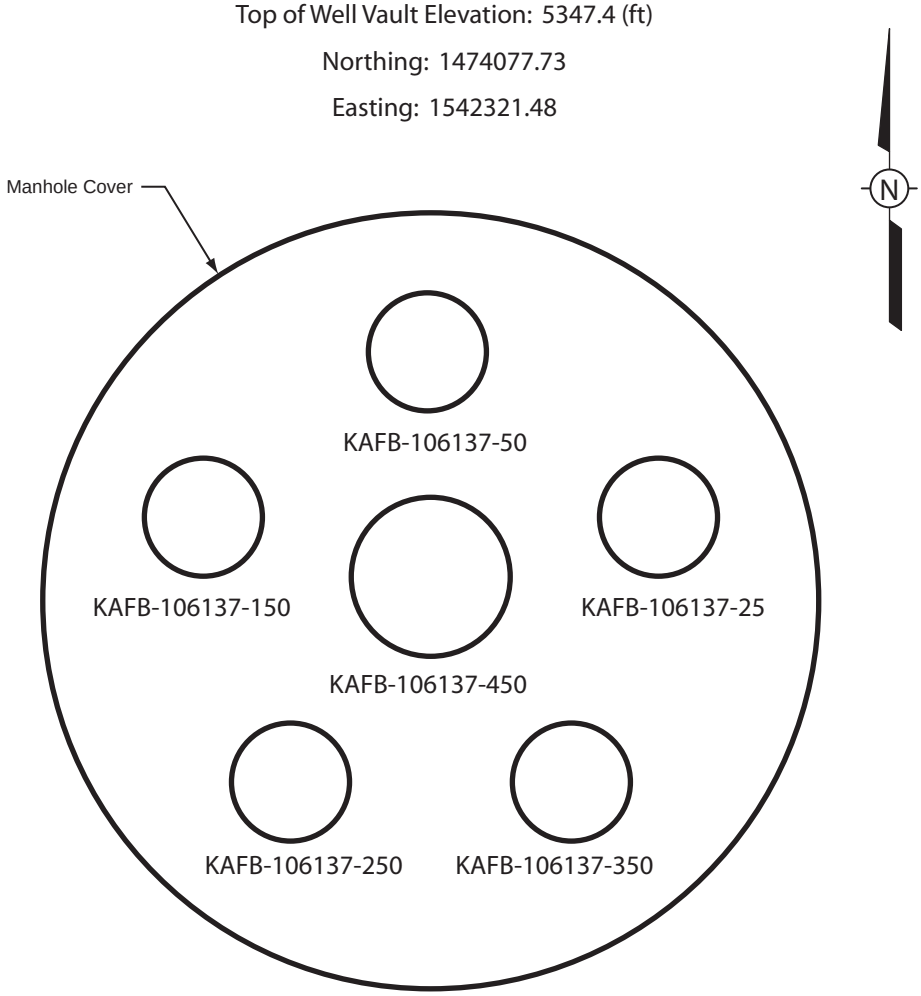
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106137



Top of Well Vault Elevation: 5347.4 (ft)

Northing: 1474077.73

Easting: 1542321.48




| Well Number | Well Diameter | Well Depth | Screened Interval | Northing | Easting | Elevation |
|---|---|---|---|---|---|---|
| KAFB-106137-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1,474,077.36 | 1,542,321.63 | 5,346.8 |
| KAFB-106137-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1,474,077.54 | 1,542,321.39 | 5,346.7 |
| KAFB-106137-150 | 3/4 | 150.0 | 140.0 - 150.0 | 1,474,077.35 | 1,542,321.11 | 5,346.7 |
| KAFB-106137-250 | 3/4 | 250.1 | 240.1 - 250.1 | 1,474,077.08 | 1,542,321.25 | 5,346.9 |
| KAFB-106137-350 | 3/4 | 350.5 | 340.5 - 350.5 | 1,474,077.09 | 1,542,321.59 | 5,346.9 |
| KAFB-106137-450 | 3 | 450.0 | 440.0 - 450.0 | 1,474,077.42 | 1,542,321.39 | 5,346.9 |

# Borehole ID: KAFB-106138

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/3/2011
Date TD Reached: 4/5/2011
Date Completed: 4/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1475006.89
X Coordinate: 1541535.98

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | No description recorded; fill. | | Concrete Seal | Hand augered. |
| 5 | | | | | Silty SAND (SM); brown (7.5YR 4/3); moist; loose; 60% fine to coarse sand; trace fine gravel to 8mm; rounded; 40% silt. | SM | | ***Note: no headspace requirement at this location.*** |
| | | | | | Sandy SILT (ML); light brown (7.5YR 6/3); dry; soft; low plasticity; 60% silt; 35% fine to coarse sand; 5% fine gravel to 7mm. | | Bentonite Seal | Began drilling @ 1623 on 4/3/11. |
| 10 | | | | | Same as above (5 ft). | | Top of Filter Pack | |
| 15 | | | | | Same as above (5 ft); brown (7.5YR 5/4). | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 20 | | | | | Same as above (5 ft); strong brown (7.5YR 5/6). | | | New connection @ 1633. Resumed drilling @ 1644. |
| 25 | | | | | Same as above (5 ft); strong brown (7.5YR 5/6). | | Bottom of Screen | |
| 30 | | | | | | | Bentonite Seal | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/16/11 11:17 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106138

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/3/2011
Date TD Reached: 4/5/2011
Date Completed: 4/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1475006.89
X Coordinate: 1541535.98

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Sandy lean CLAY (CL); brown (7.5YR 5/4); moist; soft; medium plasticity; 70% clay; 30% fine to medium sand to 1mm. | CL | | |
| | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; soft; low plasticity; 85% silt; 15% very fine sand to 0.08mm. | | Bentonite Seal | |
| 35 | | | | | Same as above (32 ft). | | | New connection @ 1655. |
| | | | | | | | Top of Filter Pack | |
| 40 | | | | | Sandy SILT (ML); light brown (7.5YR 6/4); dry; soft; low plasticity; 65% silt; 5% clay; 30% fine sand. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 45 | | | | | SILT with Sand (ML); brown (7.5YR 5/4); dry; soft; low plasticity; 85% silt; 15% very fine sand to 0.08mm. | ML | | |
| 50 | | | | | Sandy SILT (ML); light brown (7.5YR 6/4); dry; soft; low plasticity; 65% silt; 5% clay; 30% fine sand. | | Bottom of Screen | |
| 55 | | | | | Same as above (50 ft). | | Bentonite Seal | New connection @ 1715. End of 4/3/11. |
| 60 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/16/11 11:17 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106138

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/3/2011
Date TD Reached: 4/5/2011
Date Completed: 4/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1475006.89
X Coordinate: 1541535.98

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Lean CLAY with Sand (CL); strong brown (7.5YR 4/6); moist; stiff; medium plasticity; 80% clay; 20% fine to coarse sand to 4mm. | | | Resumed drilling @ 0816 on 4/4/11. |
| 65 | | | | | Same as above (60 ft); 75% clay; 5% silt; 20% fine to coarse sand to 4mm. | CL | | |
| 70 | | | | | Lean CLAY (CL); strong brown (7.5YR 4/6); moist; stiff; medium plasticity; 95% clay; 5% fine to coarse sand to 4mm. | | | |
| 75 | | | | | SILT with Sand (ML); strong brown (7.5YR 4/6); moist; stiff; low plasticity; 85% silt; 15% fine to coarse sand; trace fine gravel to 1.4cm. | | Bentonite Seal | New connection @ 0828. Resumed drilling @ 0841. |
| 80 | | | | | Same as above (75 ft); 75% silt; 25% sand. | ML | | |
| 85 | | | | | Same as above (75 ft); 5% clay. | | | Cyclone hose became plugged @ 0855. Resumed drilling @ 0925. |
| 90 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/16/11 11:17 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106138

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/3/2011
Date TD Reached: 4/5/2011
Date Completed: 4/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1475006.89
X Coordinate: 1541535.98

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Lean CLAY (CL); brown (7.5YR 5/4); moist; stiff; low plasticity; 85% clay; 15% silt. | CL | | |
| 95 | | | | | Same as above (90 ft). | | | New connection @ 0934. Resumed drilling @ 1332. |
| 100 | | | | | Poorly graded SAND (SP); strong brown (7.5YR 4/6); moist; loose; 95% fine sand to 0.5mm; rounded; 5% silt. | SP | | |
| 105 | | | | | SILT with Sand (ML); brown (7.5YR 4/4); moist; soft; nonplastic; 75% silt; 25% fine to coarse sand; trace fine gravel to 2.1cm. | ML | Bentonite Seal | |
| 110 | | | | | Same as above (105 ft); 5% clay; no gravel. | | | |
| | | | | | Lean CLAY (CL); lense. | CL | | |
| 115 | | | | | SILT (ML); yellowish brown (10YR 5/6); moist; soft; nonplastic; 90% silt; 10% very fine sand to 0.08mm. | ML | | New connection @ 1344. Resumed drilling @ 1350. |
| | | | | | Lean CLAY (CL); lense. | CL | | |
| 120 | | | | | SILT (ML); yellowish brown (10YR 5/6); moist; soft; nonplastic; 90% silt; 10% very fine sand to 0.08mm. | ML | | |

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# Borehole ID: KAFB-106138

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/3/2011
Date TD Reached: 4/5/2011
Date Completed: 4/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1475006.89
X Coordinate: 1541535.98

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT (ML); yellowish brown (10YR 5/6); moist; soft; nonplastic; 90% silt; 10% very fine sand to 0.08mm. | ML | | TD with 11-3/4" casing @ 1354. Resumed drilling @ 1530 with 9-5/8" casing. |
| 125 | | | | | Lean CLAY (CL); brown (7.5YR 5/4); moist; stiff; medium plasticity; 90% clay; 10% silt. | CL | Bentonite Seal | |
| 130 | | | | | Same as above (123 ft). | | | |
| 135 | | | | | Same as above (123 ft); 85% clay; 10% silt; 5% fine sand to 0.2mm. | | | |
| 140 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; dense; 95% fine sand to 0.5mm; rounded; 5% silt. | SP | Top of Filter Pack | |
| | | | | | Same as above (137 ft). | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 145 | | | | | Well graded SAND with Silt (SW-SM); dark yellowish brown (10YR 4/4); moist; medium dense; 90% fine to very coarse sand; trace fine gravel to 8mm; 10% silt. | SW-SM | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106138

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/3/2011
Date TD Reached: 4/5/2011
Date Completed: 4/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1475006.89
X Coordinate: 1541535.98

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; medium dense; 100% fine to medium sand to 1mm; rounded; trace fines. | | Bottom of Screen | |
| 155 | | | | | Same as above (150 ft); 5% coarse sand to 3mm. | SP | | New connection @ 1559. Resumed drilling @ 1606. |
| 160 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% very fine to coarse sand to 4mm; rounded. | SW | | |
| 165 | | | | | Clayey SAND (SC); brown (10YR 4/3); damp; dense; 70% well graded sand; trace fine gravel to 1.2cm; subrounded; 30% clay. | SC | Bentonite Seal | |
| | | | | | Lean CLAY (CL); dark yellowish brown (10YR 4/4); moist; very stiff; medium plasticity; 100% clay. | CL | | |
| 170 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 95% very fine to coarse sand; trace fine gravel to 1.2cm; rounded; 5% silt. | | | |
| 175 | | | | | Same as above (169 ft); pale brown (10YR 6/3). | SW | | New connection @ 1612. Resumed drilling @ 1619. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106138

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/3/2011
Date TD Reached: 4/5/2011
Date Completed: 4/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1475006.89
X Coordinate: 1541535.98

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); moist; loose; 95% very fine to coarse sand; trace fine gravel to 1.2cm; rounded; 5% silt. | | | |
| 185 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); moist; loose; 80% very fine to coarse sand; 15% fine gravel to 2.3cm; rounded; 5% silt. | | | |
| 190 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 95% very fine to coarse sand; trace fine gravel to 1.2cm; rounded; 5% silt. | SW | | |
| 195 | | | | | Same as above (190 ft). | | Bentonite Seal | |
| 200 | | | | | Same as above (190 ft). | | | |
| 205 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; loose; 90% medium sand; 10% fine gravel to 2.5cm; well rounded. | SP | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106138

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/3/2011
Date TD Reached: 4/5/2011
Date Completed: 4/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1475006.89
X Coordinate: 1541535.98

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded SAND with Gravel (SP); brown (10YR 5/3); damp; loose; 85% medium to coarse sand; 15% fine gravel to 2.5cm; well rounded. | | | |
| 215 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; loose; 100% medium to coarse sand. | SP | | New connection @ 1639. Resumed drilling @ 1647. |
| 220 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; loose; 100% medium sand. | | Bentonite Seal | |
| 225 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 95% fine to very coarse sand; 5% fine gravel to 7mm; rounded. | | | |
| 230 | | | | | Same as above (225 ft). | SW | | |
| 235 | | | | | Same as above (225 ft); trace fine gravel to 2.6cm. | | Top of Filter Pack | New connection @ 1652. Resumed drilling @ 1658. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106138

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/3/2011
Date TD Reached: 4/5/2011
Date Completed: 4/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1475006.89
X Coordinate: 1541535.98

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); moist; loose; 80% fine to very coarse sand; 20% fine gravel to 7mm; rounded. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 245 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 95% fine to very coarse sand; 5% fine gravel to 7mm; rounded. | SW | | |
| 250 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); moist; loose; 100% fine to medium sand to 1mm; rounded; trace silt. | | Bottom of Screen | |
| 255 | | | | | Same as above (250 ft); 100% medium sand. | SP | | New connection @ 1704. End of 4/4/11. Resumed drilling @ 0801 on 4/5/11. |
| 260 | | | | | Lean CLAY (CL); brown (10YR 5/3); damp; stiff; medium plasticity; 95% clay; 5% fine to medium sand to 2mm. | CL | | |
| 265 | | | | | Clayey SAND (SC); brown (10YR 5/3); moist; medium dense; 70% fine to medium sand to 1mm; rounded; 30% clay. | SC | Bentonite Seal | |
| 270 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; medium dense; 100% medium sand to 2mm; rounded. | SP | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/16/11 11:17 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106138

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/3/2011
Date TD Reached: 4/5/2011
Date Completed: 4/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1475006.89
X Coordinate: 1541535.98

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; medium dense; 100% medium sand to 2mm; rounded. | SP | | |
| 275 | | | | | Same as above (270 ft). | | | New connection @ 0807. Resumed drilling @ 0816. |
| 280 | | | | | Lean CLAY (CL); brown (10YR 5/3); moist; very stiff; medium plasticity; 100% clay. | CL | | |
| 285 | | | | | Sandy lean CLAY (CL); brown (10YR 5/3); moist; very stiff; medium plasticity; 70% clay; 30% well graded sand to 4.8mm. | | Bentonite Seal | |
| 290 | | | | | Well graded SAND (SW); brown (10YR 5/3); damp; medium dense; 90% fine to very coarse sand; 5% fine gravel to 1.1cm; rounded; 5% clay as nodules. | SW | | |
| 295 | | | | | Same as above (285 ft). | | | |
| 300 | | | | | Same as above (285 ft); trace fine gravel; grading finer; no clay. | | | New connection @ 0824. Resumed drilling @ 0830. |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/16/11 11:17 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106138

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/3/2011
Date TD Reached: 4/5/2011
Date Completed: 4/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1475006.89
X Coordinate: 1541535.98

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); moist; loose; 60% fine gravel to 2.4cm; rounded; 35% fine to very coarse sand; 5% silt. Note: contains granitic fragments. | GP | | |
| 305 | | | | | Well graded SAND (SW); light yellowish brown (10YR 6/4); moist; loose; 100% very fine to very coarse sand; trace fine gravel to 1.8cm; rounded. | | | |
| 310 | | | | | Same as above (302 ft); grading coarser; 10% fine gravel to 9mm. | SW | | |
| 315 | | | | | Same as above (302 ft); grading finer; 5% fine gravel to 3.3cm; 5% silt. | | Bentonite Seal | New connection @ 0835. Resumed drilling @ 0847. |
| 320 | | | | | Well graded SAND with Silt (SW-SM); dark yellowish brown (10YR 4/4); dry; loose; 85% fine to very coarse sand; 5% fine gravel to 2.2cm; rounded; 10% silt. | SW-SM | | |
| 325 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% very fine to very coarse sand to 4mm; rounded. | SW | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/16/11 11:17 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106138

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/3/2011
Date TD Reached: 4/5/2011
Date Completed: 4/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1475006.89
X Coordinate: 1541535.98

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); moist; loose; 80% very fine to very coarse sand; 20% fine gravel to 1.5cm; rounded. | SW | Bentonite Seal | |
| 335 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 95% very fine to very coarse sand; 5% fine gravel to 1cm; rounded. | | Top of Filter Pack | New connection @ 0900. Resumed drilling @ 0910. |
| 340 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; loose; 100% fine to medium sand to 2mm; rounded. | SP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 345 | | | | | Same as above (338 ft); slightly finer. | | | |
| 350 | | | | | Well graded SAND (SW); brown (10YR 4/3); moist; loose; 95% fine to very coarse sand; 5% fine gravel to 8mm. | SW | Bottom of Screen | |
| 355 | | | | | Same as above (350 ft); grading finer. | | Bentonite Seal | New connection @ 0915. Resumed drilling @ 0922. |
| 360 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/16/11 11:17 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106138

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/3/2011
Date TD Reached: 4/5/2011
Date Completed: 4/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1475006.89
X Coordinate: 1541535.98

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; medium dense; 100% very fine to very coarse sand; trace fine gravel to 7mm; rounded. | | | |
| 365 | | | | | Same as above (360 ft). | SW | | |
| 370 | | | | | Same as above (360 ft); 5% fine gravel to 1.4cm. | | | |
| 375 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; dense; 100% fine to medium sand to 1.5mm; rounded. | | Bentonite Seal | New connection @ 0929. Resumed drilling @ 0934. |
| 380 | | | | | Same as above (375 ft); grading coarser to 2mm. | SP | | |
| 385 | | | | | Same as above (375 ft). | | | |
| 390 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/16/11 11:17 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106138

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/3/2011
Date TD Reached: 4/5/2011
Date Completed: 4/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1475006.89
X Coordinate: 1541535.98

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; dense; 100% fine to medium sand to 1.5mm; rounded. | | | |
| 395 | | | | | Same as above (390 ft). | SP | | New connection and resumed drilling @ 0948. |
| 400 | | | | | Same as above (390 ft); dry; 100% fine sand to 0.5mm. | | | |
| 405 | | | | | Well graded SAND (SW); brown (10YR 4/3); moist; dense; 95% very fine to very coarse sand to 4.8mm; rounded; 5% silt. | SW | Bentonite Seal | |
| 410 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; dense; 95% very fine to medium sand to 1mm; rounded; 5% silt. | SP | | |
| 415 | | | | | Same as above (408 ft); grading coarser; no fines. | | | New connection @ 0958. Resumed drilling @ 1005. |
| 420 | | | | | Clayey SAND (SC); brown (7.5YR 4/4); moist; very dense; 60% fine to coarse sand to 3mm; subrounded; 40% clay. | SC | | |

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# Borehole ID: KAFB-106138

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/3/2011
Date TD Reached: 4/5/2011
Date Completed: 4/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1475006.89
X Coordinate: 1541535.98

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/6); moist; dense; 100% fine to very coarse sand; trace fine gravel to 1.6cm; rounded; no odor; possible staining. | SW | | |
| 425 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; dense; 100% medium sand to 1mm; rounded. | | Bentonite Seal | |
| 430 | | | | | Same as above (425 ft). | SP | | |
| 435 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); damp; dense; 100% very fine to coarse sand to 3mm; rounded. | SW | Top of Filter Pack | New connection @ 1018. Resumed drilling @ 1023. |
| 440 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); damp; dense; 100% fine sand; trace medium sand to 2mm; subrounded. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 445 | | | | | Same as above (440 ft); grading coarser; 100% fine to medium sand. | SP | | |
| 450 | | | | | SILT with Sand (ML); brown (10YR 4/3); | ML | | |

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# Borehole ID: KAFB-106138

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/3/2011
Date TD Reached: 4/5/2011
Date Completed: 4/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1475006.89
X Coordinate: 1541535.98

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | dry; hard; low plasticity; 75% silt; 5% clay; 20% fine to medium sand to 1mm. | ML | Bottom of Screen | |
| 455 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); damp; dense; 95% medium to coarse sand to 4.8mm; well rounded; 5% fines. | SP | Bottom of Filter Pack<br>Native Backfill | |
| 460 | | | | | Same as above (453 ft); 100% fine to medium sand. | | | Total depth = 460 ft. Reached @ 1038 on 4/5/11.<br><br>Water added during drilling (gallons) = 0<br><br>Water added after drilling (gallons) = 0<br><br>Water added during construction (gallons) = 408 |
| 465 | | | | | | | | |
| 470 | | | | | | | | |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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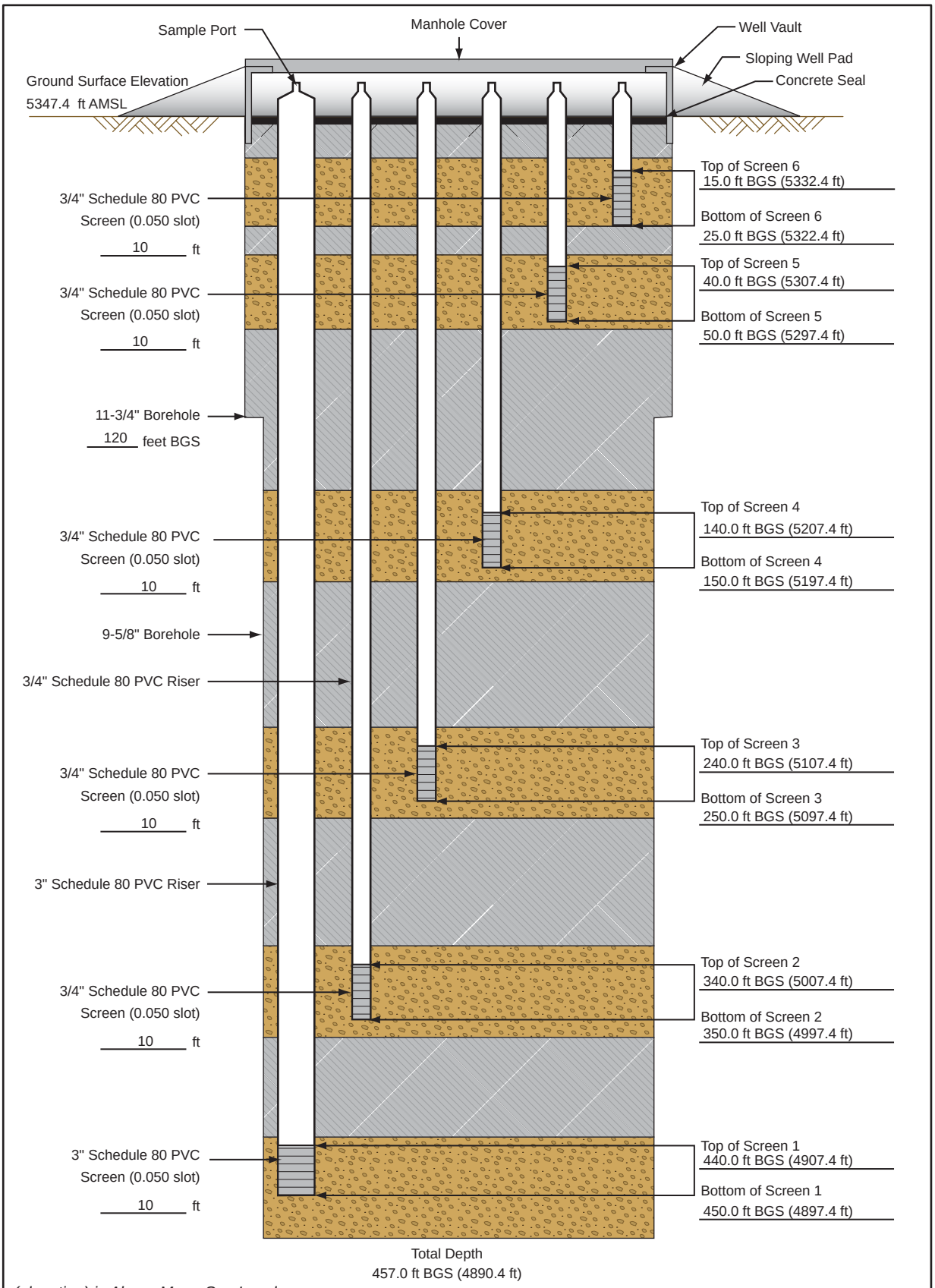
# Nested Soil Vapor Well Completion Diagram for KAFB-106138

Installation Start Date/Time: 4/6/2011 @ 08:00
Installation End Date/Time: 4/7/2011 @ 14:00



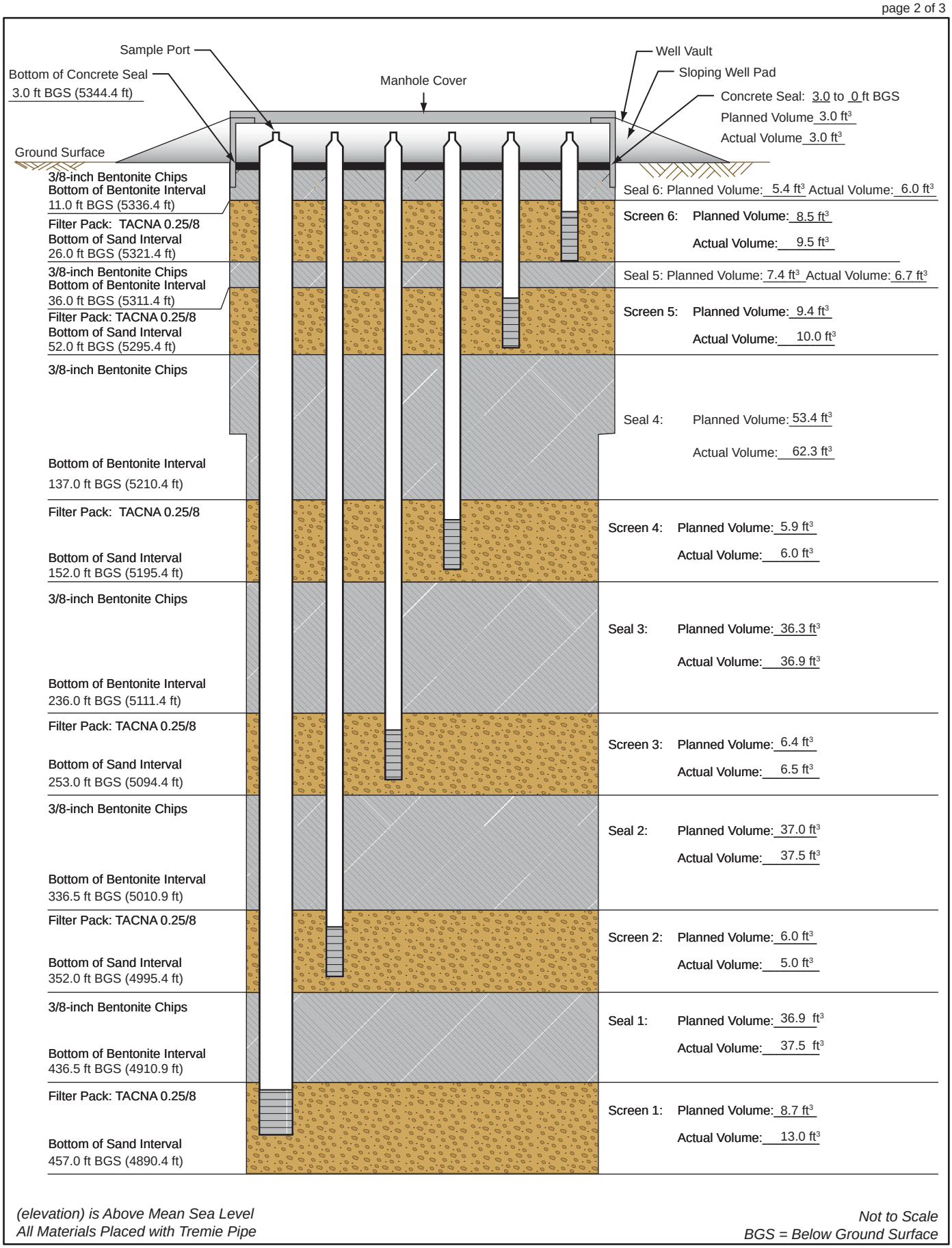



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106138






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

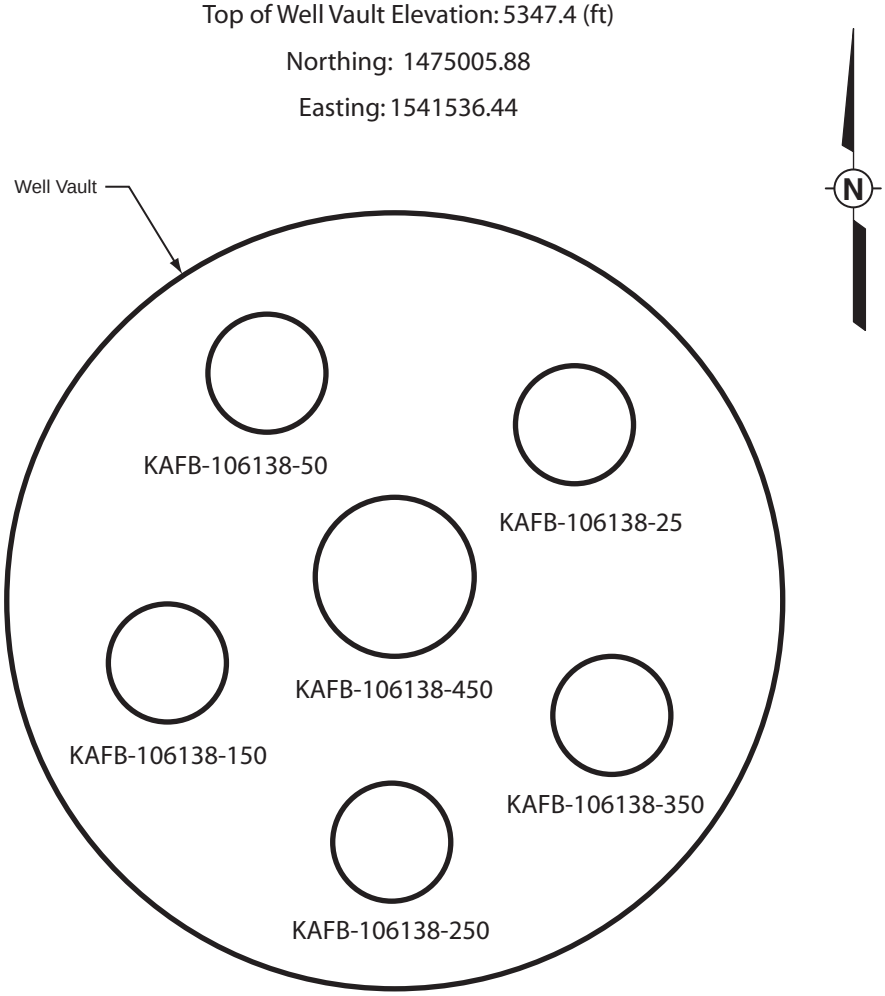
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106138



Top of Well Vault Elevation: 5347.4 (ft)

Northing: 1475005.88

Easting: 1541536.44




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106138-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1475005.68 | 1541536.74 | 5347.2 |
| KAFB-106138-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1475005.57 | 1541536.40 | 5347.2 |
| KAFB-106138-150 | 3/4 | 150.0 | 140.0 - 150.0 | 1475005.28 | 1541536.37 | 5347.1 |
| KAFB-106138-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1475005.17 | 1541536.65 | 5347.2 |
| KAFB-106138-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1475005.42 | 1541536.87 | 5347.2 |
| KAFB-106138-450 | 3 | 450.0 | 440.0 - 450.0 | 1475005.51 | 1541536.57 | 5347.2 |

# Borehole ID: KAFB-106139

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/5/2011
Date TD Reached: 1/8/2011
Date Completed: 1/8/2011

Ground Elevation AMSL (ft): 5341.3
Y Coordinate: 1474051.40
X Coordinate: 1541248.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Silty SAND (SM); light reddish brown (2.5YR 7/4); dry; loose; 60% fine sand; trace medium to coarse sand; 10% fine to coarse gravel to 3cm; subangular; 30% silt with clay. | SM | Concrete Seal | Hand augered. ***Note: No headspace requirement at this location*** |
| 5 | | | | | Sandy SILT (ML); yellowish red (5YR 5/6); dry; soft; 65% silt with clay; 35% fine sand. | | Bentonite Seal | Began drilling 11-3/4" borehole @ 1600 on 1/5/11. |
| 10 | | | | | Same as above (5 ft); yellowish red (5YR 4/6). | | Top of Filter Pack | |
| 15 | | | | | Same as above (5 ft). | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| | | | | | SILT with Gravel (ML); light reddish brown (5YR 6/4); dry; soft; 75% silt with clay; 25% fine gravel to 1cm. | ML | | |
| 20 | | | | | SILT with Sand (ML); reddish brown (5YR 5/4); dry; soft; 80% silt with minor clay; 20% fine to coarse sand; subrounded. | | | New connection @ 1637. |
| 25 | | | | | Same as above (20 ft); reddish brown (2.5YR 4/4). | | Bottom of Screen | |
| 30 | | | | | | | Bentonite Seal | |

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# Borehole ID: KAFB-106139

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/5/2011
Date TD Reached: 1/8/2011
Date Completed: 1/8/2011

Ground Elevation AMSL (ft): 5341.3
Y Coordinate: 1474051.40
X Coordinate: 1541248.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Sandy SILT (ML); reddish brown (2.5YR 4/4); dry; soft; 70% silt with minor clay; 25% fine to coarse sand; 5% fine gravel to 1.5cm; subangular. | | Bentonite Seal | |
| 35 | | | | | Same as above (30 ft). | ML | | |
| | | | | | | | Top of Filter Pack | |
| 40 | | | | | | | | End of 1/5/11. |
| | | | | | Silty SAND with Gravel (SM); reddish brown (2.5YR 4/4); dry; loose; 60% fine to coarse sand; subrounded; 20% fine gravel to 1cm; subrounded; 20% silt with clay. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Resumed drilling on 1/6/11. New connection @ 0809. Resumed drilling @ 0811. |
| 45 | | | | | Silty SAND (SM); red (2.5YR 4/6); dry; loose; 60% fine sand; 10% fine gravel to 1cm; subangular; 30% silt and clay. | | | |
| 50 | | | | | Same as above (45 ft). | SM | Bottom of Screen | |
| 55 | | | | | Same as above (45 ft). | | Bentonite Seal | |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106139

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/5/2011
Date TD Reached: 1/8/2011
Date Completed: 1/8/2011

Ground Elevation AMSL (ft): 5341.3
Y Coordinate: 1474051.40
X Coordinate: 1541248.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT with Sand (ML); red (10R 4/6); dry; soft; 75% silt with minor clay; 25% fine to coarse sand; subangular to subrounded. | | | New connection @ 0837. Resumed drilling @0840. |
| 65 | | | | | SILT (ML); red (2.5YR 4/6); dry; soft; 90% silt with minor clay; 10% fine sand. | | | Rate of penetration slowed past 65'. |
| 70 | | | | | SILT with Sand (ML); red (2.5YR 4/6); dry; soft; 80% silt with minor clay; 20% fine to coarse sand; subangular to subrounded. | ML | | |
| 75 | | | | | Same as above (70 ft); red (2.5YR 5/6); 85% silt with minor clay; 15% sand. | | Bentonite Seal | Rig chatter past 75'. |
| 80 | | | | | Sandy SILT (ML); reddish brown (2.5YR 5/4); dry; moderate cementation; 70% silt; 25% fine to coarse sand; subrounded; 5% fine gravel to 1cm; subangular. | | | New connection @ 0917. Resumed drilling @ 0921. Rig chatter past 80', trouble driving casing. Bit stuck below below 80'. |
| 85 | | | | | Well graded SAND with Gravel (SW); weak red (2.5YR 5/2); dry; loose; 80% fine to coarse sand; 20% fine gravel to 1cm; subrounded. | SW | | Bit free @ 0935, drove casing easily. |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106139

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/5/2011
Date TD Reached: 1/8/2011
Date Completed: 1/8/2011

Ground Elevation AMSL (ft): 5341.3
Y Coordinate: 1474051.40
X Coordinate: 1541248.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Well graded SAND (SW); weak red (2.4YR 5/2); dry; loose; 95% fine to coarse sand; subangular to subrounded; 5% fine gravel to 1cm; subrounded; gravel consists of lithic fragments (granite, some volcanics) and trace feldspars. | | | |
| 95 | | | | | Same as above (90 ft). | SW | | |
| 100 | | | | | Poorly graded SAND (SP); weak red (2.5YR 5/2); dry; loose; 100% fine sand. | | | New connection @ 0954. Resumed drilling @ 0959. |
| 105 | | | | | Same as above (100 ft). | SP | Bentonite Seal | |
| 110 | | | | | Poorly graded SAND with Silt (SP-SM); weak red (2.5YR 5/2); dry; loose; 90% fine sand; 10% silt. | SP-SM | | |
| 115 | | | | | SILT (ML); reddish brown (2.5YR 4/4); moist; soft; low plasticity; 90% silt with clay; 10% fine sand. Same as above (113 ft). | ML | | |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106139

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/5/2011
Date TD Reached: 1/8/2011
Date Completed: 1/8/2011

Ground Elevation AMSL (ft): 5341.3
Y Coordinate: 1474051.40
X Coordinate: 1541248.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Lean CLAY (CL); reddish brown (2.5YR 4/4); moist; firm; medium plasticity; 90% silty clay; 10% fine sand. | CL | | New connection @ 1103. Began driving to TD 11-3/4" @1105. Stopped drilling @ 120' at 1110. Bit packed off @ TD. |
| 125 | | | | | Silty SAND (SM); weak red (2.5YR 5/2); dry; loose; 70% fine sand; 30% silt and clay nodules. | SM | Bentonite Seal | Bit free @ 1131, began tripping out. 9-5/8" to TD, new connection made (140' total). |
| 130 | | | | | Well graded SAND with Silt (SW-SM); weak red (2.5YR 5/2); dry; loose; 90% fine to coarse sand; subangular to subrounded; 10% silt and trace clay. | SW-SM | | Resumed drilling @ 1604. Resumed @ 1615. |
| 135 | | | | | Poorly graded SAND with Silt (SP-SM); reddish brown (2.5YR 5/3); dry; loose; 90% fine sand; 10% silt. | SP-SM | Top of Filter Pack | |
| 140 | | | | | Same as above (135 ft); 5% fine gravel to 1.5cm; rounded. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | New connection @ 1658. Resumed drilling @ 1700. |
| 145 | | | | | Well graded SAND with Clay and Gravel (SW-SC); weak red (2.5YR 5/2); dry; loose; 75% fine to coarse sand; subangular to subrounded; 15% gravel to 2cm; subangular; 10% clay nodules. | SW-SC | | |
| 150 | | | | | | | | |

# Borehole ID: KAFB-106139

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/5/2011
Date TD Reached: 1/8/2011
Date Completed: 1/8/2011

Ground Elevation AMSL (ft): 5341.3
Y Coordinate: 1474051.40
X Coordinate: 1541248.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Poorly graded SAND (SP); weak red (2.5YR 5/2); dry; loose; 90% fine to medium sand; 10% fine gravel to 1cm; subangular. | | Bottom of Screen | |
| 155 | | | | | Same as above (150 ft). | | | End of 1/6/11. |
| 160 | | | | | Same as above (150 ft). | SP | | New connection @ 0938 on 1/7/11. Resumed drilling @ 0940. |
| 165 | | | | | Same as above (150 ft); coarser sand; sand is predominantly quartz, feldspars, and lithic fragments. | | Bentonite Seal | |
| 170 | | | | | Poorly graded SAND (SP); weak red (2.5YR 5/2); dry; loose; 100% fine to medium sand; subrounded. | | | |
| 175 | | | | | Well graded SAND (SW); weak red (2.5YR 5/2); dry; loose; 100% fine to coarse sand; subrounded; trace fine gravel to 1cm; subrounded. | SW | | |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106139

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/5/2011
Date TD Reached: 1/8/2011
Date Completed: 1/8/2011

Ground Elevation AMSL (ft): 5341.3
Y Coordinate: 1474051.40
X Coordinate: 1541248.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND with Gravel (SW); weak red (2.5YR 5/2); dry; loose; 85% fine to coarse sand; subrounded; 15% fine to coarse gravel to 3cm; subrounded. | SW | | New connection @ 0958. Resumed drilling @ 1000. 200' total in drill string. |
| 185 | | | | | Well graded SAND with Silt and Gravel (SW-SM); reddish gray (5YR 5/2); dry; loose; 70% fine to coarse sand; subrounded; 20% fine to coarse gravel to 2cm; subrounded; 10% silt. | SW-SM | | Pumice clasts noted |
| 190 | | | | | Same as above (185 ft); 75% sand; 15% gravel; 10% silt. | | | |
| 195 | | | | | Same as above (185 ft); quartizite gravel. | | Bentonite Seal | Stopped drilling @ 1010. New connection @ 1046. Resumed drilling @ 1048. |
| 200 | | | | | Same as above (185 ft); 70% sand; 20% gravel; 10% silt. | | | 2nd compressor online. |
| 205 | | | | | Silty SAND with Gravel (SM); reddish gray (5YR 5/2); moist; loose; 65% fine to coarse sand; 20% gravel to 4cm; subrounded; 15% silt with minor clay. | SM | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106139

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/5/2011
Date TD Reached: 1/8/2011
Date Completed: 1/8/2011

Ground Elevation AMSL (ft): 5341.3
Y Coordinate: 1474051.40
X Coordinate: 1541248.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded SAND with Silt (SP-SM); reddish gray (5YR 5/2); dry; loose; 90% fine sand; trace fine gravel to 1cm; 10% silt. | SP-SM | | |
| 215 | | | | | Silty SAND (SM); reddish gray (5YR 5/2); dry; loose; 80% fine sand; 20% silt. | SM | | |
| 220 | | | | | Well graded SAND (SW); reddish grey (5YR 5/2); dry; loose; 95% fine to coarse sand; subangular to subrounded; 5% fine gravel to 1.5cm; subrounded. | SW | Bentonite Seal | New connection @ 1139. Resumed drilling @ 1141. |
| 225 | | | | | Same as above (220 ft). | | | |
| 230 | | | | | Well graded SAND with Gravel (SW); reddish gray (5YR 5/2); dry; loose; 85% fine to coarse sand; subangular to subrounded; 15% gravel to 4cm; subangular to subrounded. | | | |
| 235 | | | | | Poorly graded SAND (SP); reddish gray (5YR 5/2); dry; loose; 100% fine sand; some medium; trace silt. | SP | Top of Filter Pack | Stopped drilling @ 1157. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106139

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/5/2011
Date TD Reached: 1/8/2011
Date Completed: 1/8/2011

Ground Elevation AMSL (ft): 5341.3
Y Coordinate: 1474051.40
X Coordinate: 1541248.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND (SP); reddish gray (5YR 5/2); dry; loose; 100% fine sand; some medium; trace silt. | SP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | New connection @1209. Resumed drilling @ 1210. |
| 245 | | | | | Poorly graded SAND with Silt (SP-SM); reddish gray (5YR 5/2); dry to moist; loose; 90% sand; 10% silt. | SP-SM | | Rate of penetration slowed below 235' bgs. |
| 250 | | | | | Same as above (245 ft). | | Bottom of Screen | |
| 255 | | | | | Same as above (245 ft). | | | Stopped drillng @ 1238. End of 1/7/11. |
| 260 | | | | | Silty SAND (SM); brown (7.5YR 4/3); dry to moist; loose; 80% fine sand; 20% silt. | SM | Bentonite Seal | New connection @ 1000 on 1/8/11. Resumed drilling @ 1006. |
| 265 | | | | | Well graded SAND (SW); weak red (2.5YR 5/2); dry to moist; loose; 95% fine to coarse sand; subangular to subrounded; 5% fine gravel to 1cm; subangular. | SW | | |
| 270 | | | | | | | | |

# Borehole ID: KAFB-106139

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/5/2011
Date TD Reached: 1/8/2011
Date Completed: 1/8/2011

Ground Elevation AMSL (ft): 5341.3
Y Coordinate: 1474051.40
X Coordinate: 1541248.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Well graded SAND (SW); weak red (2.5YR 5/2); dry to moist; loose; 95% fine to coarse sand; subangular to subrounded; 5% fine to medium gravel to 3cm; subrounded. | SW | | Rate of penetration increased. |
| 275 | | | | | Silty GRAVEL with Sand (GM); brown (7.5YR 4/4); moist; loose; 60% fine to coarse gravel to 5cm; subrounded to subangular; 25% fine to coarse sand; subrounded; 15% silt and clay. | GM | | |
| 280 | | | | | Poorly graded SAND with Silt (SP-SM); weak red (2.5YR 4/2); dry; loose; 90% fine sand with minor medium sand; 10% silt. | SP-SM | Bentonite Seal | Stopped drilling @ 1010. New connection @ 1022. |
| 285 | | | | | Same as above (280 ft); trace coarse sand; subrounded to subangular. | | | |
| 290 | | | | | Poorly graded SAND (SP); weak red (2.5YR 5/2); dry; loose; 95% fine sand; 5% silt. | SP | | |
| 295 | | | | | Same as above (290 ft). | | | Stopped drilling @ 1036. |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106139

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/5/2011
Date TD Reached: 1/8/2011
Date Completed: 1/8/2011

Ground Elevation AMSL (ft): 5341.3
Y Coordinate: 1474051.40
X Coordinate: 1541248.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded SAND with Gravel (SW); reddish gray (2.5YR 6/1); dry; loose; 85% fine to coarse sand; subrounded; 15% fine to coarse gravel to 7cm; subrounded; with trace cobbles to 8cm; rounded. | SW | | New connection @ 1046. Resumed drilling @1047. |
| 305 | | | | | Poorly graded SAND with Silt (SP-SM); brown (7.5YR 4/3); dry to moist; loose; 90% fine sand; trace medium to coarse sand; 10% silt. | SP-SM | | |
| 310 | | | | | Poorly graded SAND (SP); dark reddish gray (5YR 4/2); dry; loose; 95% fine sand; 5% silt. | SP | Bentonite Seal | Rate of penetration slowed down. |
| 315 | | | | | Same as above (310 ft). | | | |
| 320 | | | | | Well graded SAND (SW); dark reddish gray (5YR 4/2); dry; loose; 95% fine to coarse sand; subangular to subrounded; 5% fine gravel to 1cm; subangular. | SW | | Stopped drilling @ 1102. New connection @ 1155. Resumed drilling @ 1157. |
| 325 | | | | | Same as above (320 ft). | | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106139

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/5/2011
Date TD Reached: 1/8/2011
Date Completed: 1/8/2011

Ground Elevation AMSL (ft): 5341.3
Y Coordinate: 1474051.40
X Coordinate: 1541248.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Poorly graded SAND (SP); weak red (2.5YR 5/2); dry; loose; 95% fine sand; minor medium to coarse sand; subrounded; 5% silt. | | Bentonite Seal | |
| 335 | | | | | Same as above (330 ft); 95% fine sand; 5% silt. | SP | | Rig chatter around 335'. |
| 340 | | | | | | | Top of Filter Pack | |
| | | | | | Well graded SAND (SW); weak red (2.5YR 5/2); dry; loose; 95% fine to coarse sand; trace fine gravel to 1cm; subrounded; 5% silt. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Stopped drilling @ 1208. New connection @ 1223. Resumed drilling @ 1225. |
| 345 | | | | | Well graded SAND with Gravel (SW); weak red (2.5YR 5/2); dry; loose; 80% fine to coarse sand; subrounded; 15% fine to coarse gravel to 4cm; subrounded to rounded; 5% silt. | | | |
| 350 | | | | | Well graded SAND (SW); weak red (2.5YR 5/2); dry to moist; loose; 95% fine to coarse sand; subrounded to subangular; trace fine gravel to 1cm; 5% silt. | SW | Bottom of Screen | |
| 355 | | | | | Same as above (350 ft). | | Bentonite Seal | Stopped drilling @ 1238. |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106139

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/5/2011
Date TD Reached: 1/8/2011
Date Completed: 1/8/2011

Ground Elevation AMSL (ft): 5341.3
Y Coordinate: 1474051.40
X Coordinate: 1541248.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Poorly graded SAND with Silt (SP-SM); weak red (2.5YR 5/2); dry; loose; 90% fine sand; 10% silt. | | | New connection @ 1247. Resumed drilling @ 1249. |
| 365 | | | | | Same as above (360 ft); brown (7.5YR 4/3); dry to moist; color change possibly due to oxidation (weathering surface?). | SP-SM | | |
| 370 | | | | | Well graded SAND (SW); weak red (2.5YR 5/2); dry; loose; 95% fine to coarse sand; subangular; 5% silt; sand grains consistant of lithics (granite, volcanics), quartz and quartzite, and feldspars (including weathered). | SW | | |
| 375 | | | | | Silty SAND (SM); brown (7.5YR 4/3); dry to moist; loose; 85% fine sand; minor medium to coarse sand; subangular; 15% silt. | SM | Bentonite Seal | |
| 380 | | | | | Well graded SAND (SW); brown (7.5YR 4/3); dry to moist; loose; 95% fine to coarse sand; subangular to angular; 5% silt. | SW | | Stopped drilling @ 1305. New connection @ 1321. Resumed drilling @ 1323. |
| 385 | | | | | Poorly graded SAND (SP); weak red (2.5YR 5/2); dry; loose; 95% fine sand; minor medium sand; 5% silt. | SP | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106139

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/5/2011
Date TD Reached: 1/8/2011
Date Completed: 1/8/2011

Ground Elevation AMSL (ft): 5341.3
Y Coordinate: 1474051.40
X Coordinate: 1541248.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); weak red (2.5YR 5/2); dry; loose; 95% fine sand; minor medium sand; 5% silt. | | | |
| 395 | | | | | Same as above (390 ft); 95% very fine to fine sand; 5% silt. | | | |
| 400 | | | | | Poorly graded SAND (SP); weak red (2.5YR 5/2); dry; loose; 95% fine sand; minor medium sand; 5% silt. | | | Stopped drilling @ 1338. New connection @ 1345. Resumed drilling @ 1346. |
| 405 | | | | | Same as above (400 ft); 95% fine sand; 5% silt. | SP | Bentonite Seal | |
| 410 | | | | | Poorly graded SAND (SP); weak red (2.5YR 5/2); dry; loose; 95% fine to medium sand; subangular to subrounded; 5% silt. | | | |
| 415 | | | | | Same as above (410 ft); 95% fine sand, 5% silt. | | | Stopped drilling @ 1407. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106139

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/5/2011
Date TD Reached: 1/8/2011
Date Completed: 1/8/2011

Ground Elevation AMSL (ft): 5341.3
Y Coordinate: 1474051.40
X Coordinate: 1541248.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); weak red (2.5YR 5/2); dry; loose; 95% fine to coarse sand; subangular to subrounded; 5% silt. | SW | | |
| 425 | | | | | Sandy SILT (ML); brown (7.5YR 4/4); moist; soft; 60% silt with minor clay; 40% fine sand; trace medium to coarse sand. | ML | Bentonite Seal | |
| 430 | | | | | Silty SAND (SM); brown (7.5YR 5/3); dry to moist; loose; 75% fine sand; 25% silt with trace clay. | SM | | |
| 435 | | | | | Same as above (430 ft); moist. | | | |
| 440 | | | | | | | Top of Filter Pack | |
| | | | | | Sandy SILT (ML); brown (7.5YR 4/4); moist; soft to firm; 60% silt with minor clay; 40% fine sand. | ML | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Poor recovery. Poor to no cuttings returned. Stopped drilling @ 1436. New connection @ 1449. Resumed drilling @ 1450. |
| 445 | | | | | Silty SAND (SM); brown (7.5YR 5/3); dry to moist; 75% very fine to fine sand; 25% silt with trace clay. Same as above (445 ft); sand becoming coarser; fine to coarse sand. | SM | | |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106139

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/5/2011
Date TD Reached: 1/8/2011
Date Completed: 1/8/2011

Ground Elevation AMSL (ft): 5341.3
Y Coordinate: 1474051.40
X Coordinate: 1541248.76

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Brian Lucero



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | |
| | | | | | Well graded SAND with Silt (SW-SM); brown (7.5YR 5/3); moist; loose; 90% fine to coarse sand; subrounded; 10% silt with trace clay. | SW-SM | Bottom of Screen | |
| 455 | | | | | | | | |
| | | | | | Silty SAND (SM); weak red (2.5YR 5/2); dry; loose; 70% fine sand; 30% silt. | SM | | |
| 460 | | | | | | | | |
| | | | | | | | | Total depth = 460 ft. Reached @1511 on 1/8/2011. |
| 465 | | | | | | | | Water added during drilling (gallons) = 0 |
| | | | | | | | | Water added during construction (gallons) = Not Recorded |
| 470 | | | | | | | | |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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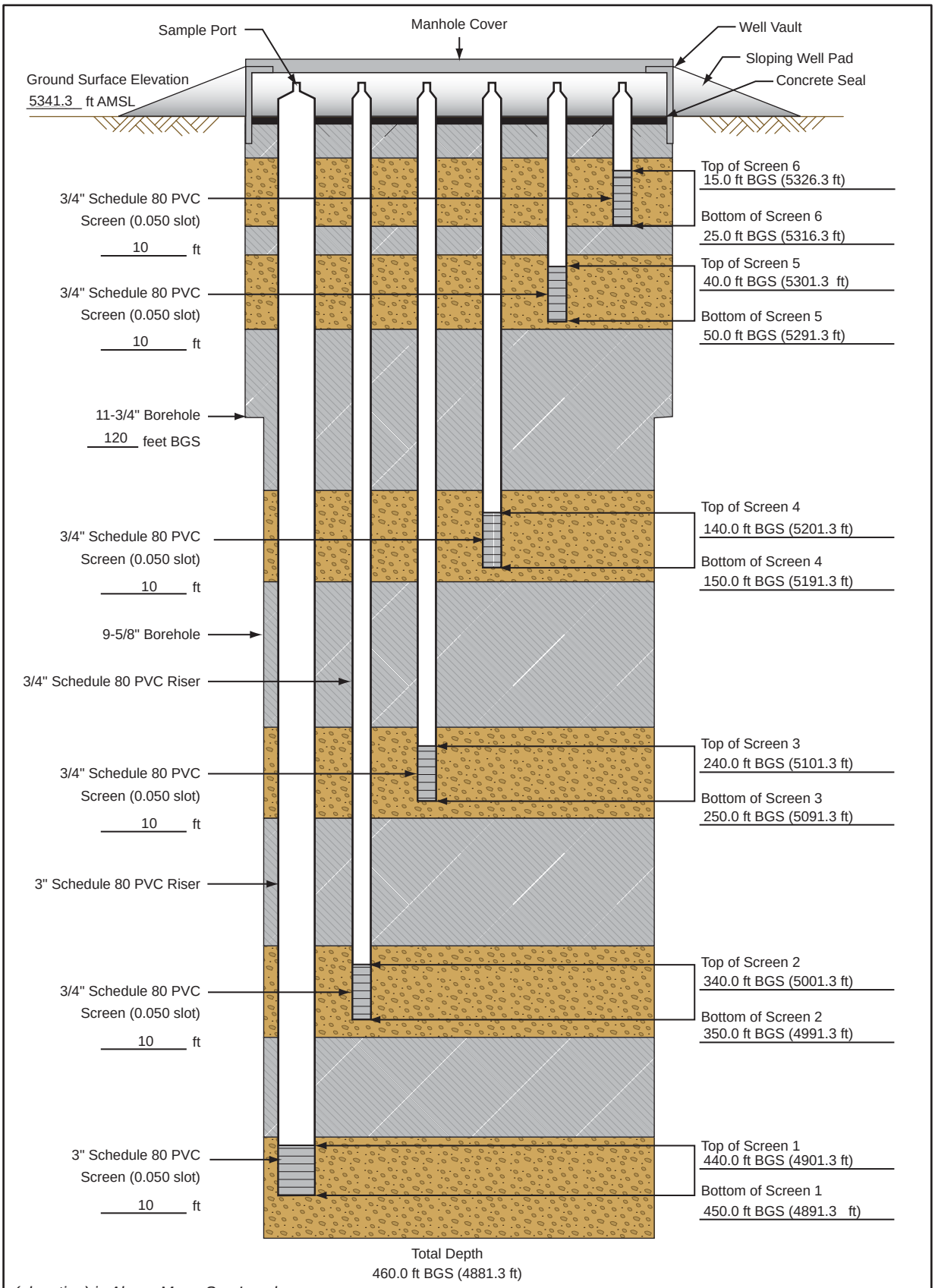
# Nested Soil Vapor Well Completion Diagram for KAFB-106139

Installation Start Date/Time: 1/11/2011 @ 11:26
Installation End Date/Time: 1/14/2011 @ 15:00



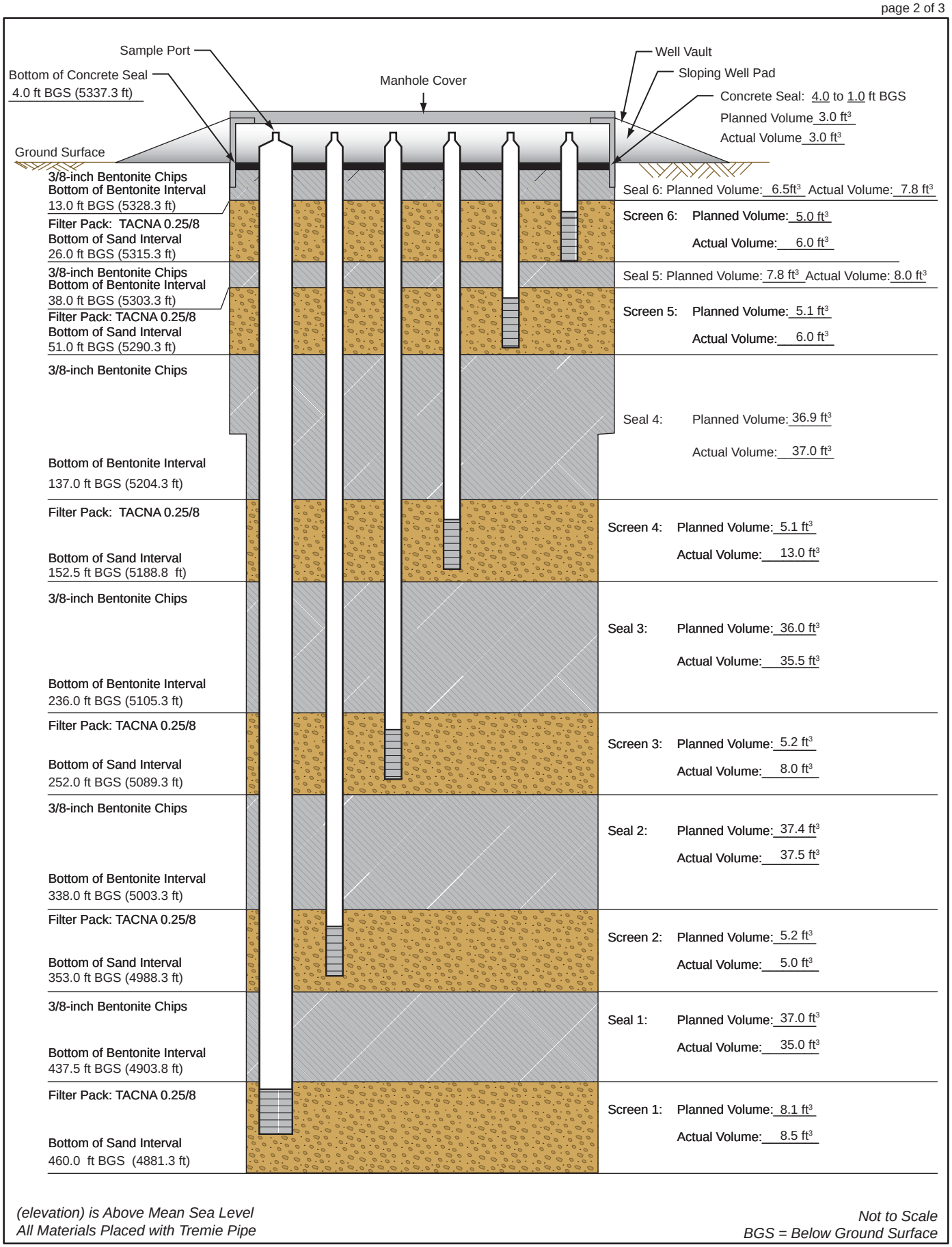



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106139






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

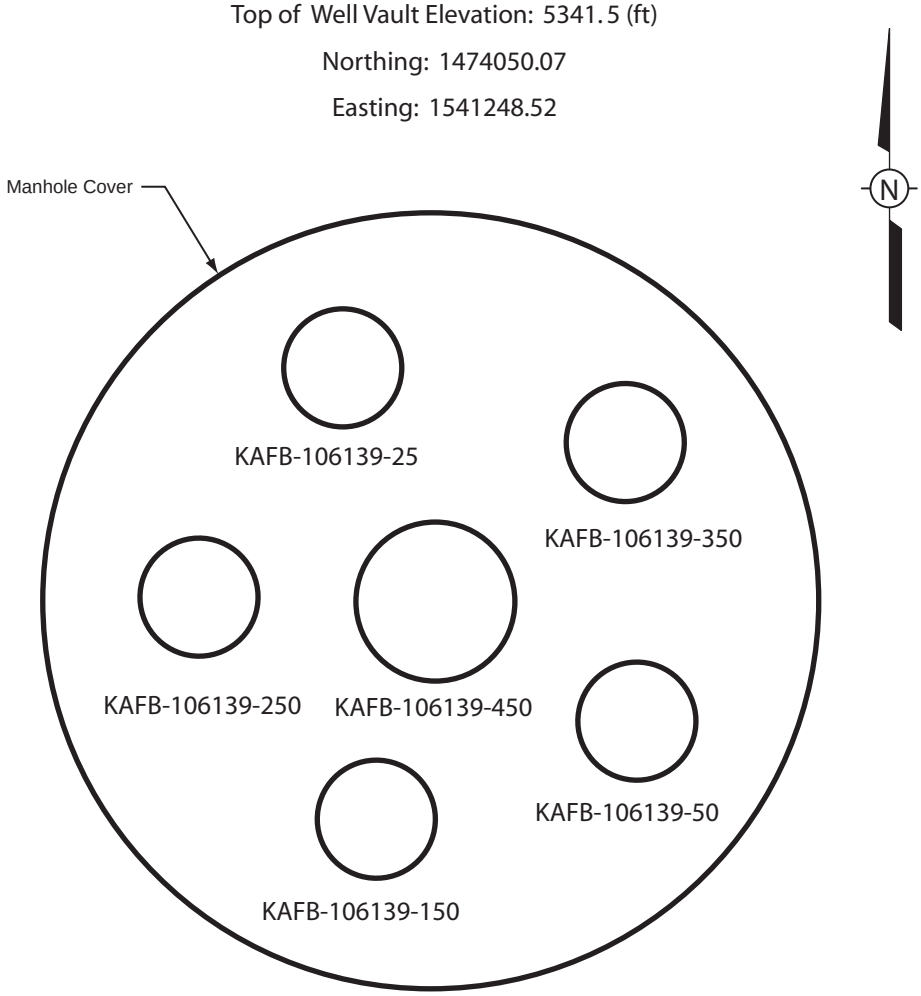
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106139



Top of Well Vault Elevation: 5341.5 (ft)

Northing: 1474050.07

Easting: 1541248.52




| Well Number | Well Diameter | Well Depth | Screened Interval | Northing | Easting | Elevation |
|---|---|---|---|---|---|---|
| KAFB-106139-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1,474,049.85 | 1,541,248.32 | 5,341.0 |
| KAFB-106139-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1,474,049.41 | 1,541,248.53 | 5,341.0 |
| KAFB-106139-150 | 3/4 | 150.0 | 140.0 - 150.0 | 1,474,049.29 | 1,541,248.26 | 5,341.0 |
| KAFB-106139-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1,474,049.60 | 1,541,248.11 | 5,341.0 |
| KAFB-106139-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1,474,049.74 | 1,541,248.60 | 5,341.0 |
| KAFB-106139-450 | 3 | 450.0 | 440.0 - 450.0 | 1,474,049.68 | 1,541,248.45 | 5,341.0 |

# Borehole ID: KAFB-106140

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/10/2011
Date TD Reached: 1/12/2011
Date Completed: 1/20/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1472634.47
X Coordinate: 1542237.30

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | No description recorded. | | Concrete Seal | Hand augered.<br><br>***Note: no headspace requirement at this location*** |
| 5 | | | | | Sandy SILT (ML); light reddish brown (5YR 6/3); moist; soft; low plasticity; 70% silt; 30% fine sand; trace gravel to 7mm. | | Bentonite Seal | Began drilling @1600 on 1/10/11. |
| 10 | | | | | Same as above (5ft); reddish brown (5YR 3/4); increasing gravel to 1.5cm. | | Top of Filter Pack | |
| 15 | | | | | Same as above (10ft); trace clay nodules; less gravel. | ML | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 20 | | | | | Same as above (10ft); increasing clay nodules. | | | |
| 25 | | | | | SILT (ML); reddish brown (5YR 5/4); moist; soft; low plasticity; 70% silt; 20% lean clay; 10% fine sand to 0.1mm. | | Bottom of Screen<br>Bentonite Seal | |
| 30 | | | | | | | | |

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# Borehole ID: KAFB-106140

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/10/2011
Date TD Reached: 1/12/2011
Date Completed: 1/20/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1472634.47
X Coordinate: 1542237.30

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); reddish brown (5YR 5/4); moist; soft; low plasticity; 70% silt; 20% lean clay; 10% fine sand to 0.1mm. | | Bentonite Seal | |
| 35 | | | | | Same as above (30 ft). | | | |
| 40 | | | | | SILT with Sand (ML); reddish brown (2.5YR 5/3); moist; soft; low plasticity; 80% silt and clay; 15% fine sand; 5% fine gravel to 1cm. | | Top of Filter Pack<br>Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 45 | | | | | SILT with Sand (ML); yellowish red (5YR 4/6); dry; very soft; 80% silt; 15% medium sand; 5% fine gravel to 7mm; trace clay nodules. | ML | | |
| 50 | | | | | SILT with Sand and Gravel (ML); reddish brown (5YR 5/4); dry; very soft; 60% silt; 20% medium to very coarse sand; 20% fine gravel to 1.5cm. | | Bottom of Screen | |
| 55 | | | | | Same as above (50 ft); soft; 70% silt; 20% coarse sand; 10% fine gravel to 2cm. | | Bentonite Seal | |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106140

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/10/2011
Date TD Reached: 1/12/2011
Date Completed: 1/20/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1472634.47
X Coordinate: 1542237.30

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT with Sand and Gravel (ML); reddish brown (5YR 5/4); dry; very soft; 60% silt; 20% medium to very coarse sand; 20% fine gravel to 1.5cm. | ML | | End of 1/10/11 @ 1715. |
| 65 | | | | | Silty SAND with Gravel (SM); reddish brown (5YR 4/4); dry; very loose; 60% fine to very fine sand; 20% gravel to 1.5cm; subangular to subrounded; granitic clasts; 20% silt. | SM | | Beginning of 1/11/11 @ 0915. P. Ostrye (Geologist) began logging. |
| 70 | | | | | Sandy lean CLAY (CL); reddish brown (5YR 4/4); dry; very soft; medium plasticity; 60% clay; 40% fine to very fine sand; no gravel. | CL | | Cylcone hose popped off of casing hammer @ 0930. Resumed drilling @ 1055. |
| 75 | | | | | Same as above (70 ft); 5% very coarse sand; subangular. | | Bentonite Seal | |
| 80 | | | | | Well graded SAND (SW); light reddish brown (2.5YR 6/3); dry; very loose; 95% very coarse to very fine sand; 5% gravel to 6mm; angular to subangular. | SW | | |
| 85 | | | | | Silty SAND (SM); reddish brown (5YR 4/4); dry; very loose; 80% fine to very fine sand; 20% silt. | SM | | Stopped drilling to clean out cyclone @ 1115. Casing collar stuck. |
| 90 | | | | | Poorly graded SAND (SP); yellowish red (5YR 5/6); dry; very loose; 95% very fine to fine sand; 5% silt. | SP | | Resumed drilling @ 1320. |

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# Borehole ID: KAFB-106140

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/10/2011
Date TD Reached: 1/12/2011
Date Completed: 1/20/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1472634.47
X Coordinate: 1542237.30

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Poorly graded SAND (SP); yellowish red (5YR 5/6); dry; very loose; 95% very fine to fine sand; 5% silt. | SP | | Resumed drilling @ 1320. |
| 95 | | | | | Clayey SAND (SC); reddish brown (5YR 5/4); dry; very loose; 70% well graded very fine to coarse sand; 5% gravel to 10mm; angular to subrounded; 20% clay and silt. | SC | | |
| 100 | | | | | Lean CLAY with Sand (CL); reddish brown (5YR 4/3); dry; firm; high plasticity; 80% clay; 20% fine to very fine sand. | CL | Bentonite Seal | |
| 105 | | | | | Lean CLAY with Sand (CL); reddish brown (5YR 4/3); dry; firm; medium to high plasticity; 75% clay; 25% medium to very fine sand. | | | |
| 110 | | | | | Lean CLAY with Sand (CL); reddish brown (5YR 4/3); dry; soft; high plasticity; 85% clay; 15% very fine sand. | | | |
| 115 | | | | | Poorly graded SAND (SP); pinkish gray (7.5YR 7/2); dry; very loose; 95% medium to very fine sand; angular to subrounded; 5% fines. | SP | | Air hammer hose blew off @1410. End of 1/11/11. |
| | | | | | Same as above (110 ft). | | | Beginning of 1/12/11. |
| 120 | | | | | | SW | | |

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# Borehole ID: KAFB-106140

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/10/2011
Date TD Reached: 1/12/2011
Date Completed: 1/20/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1472634.47
X Coordinate: 1542237.30

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Well graded SAND (SW); light reddish brown (5YR 5/3); dry; loose; 90% very coarse to very fine sand; 5% gravel to 10mm; subrounded; tuft clasts; 5% fines. Well graded SAND with Gravel (SW); light reddish brown (5YR 5/3); 80% very coarse to very fine sand; 15% gravel to 20mm; 5% fines. | SW | | Telescope to 9-5/8". Stopped drilling @ 0820. Resumed drilling @ 1155. |
| 125 | | | | | Clayey SAND (SC); brown (7.5YR 4/4); moist; loose; 60% fine to very fine sand; 40% clay. | SC | Bentonite Seal | |
| 130 | | | | | Clayey SAND (SC); strong brown (7.5YR 5/6); moist; loose; 60% medium to very fine sand; 40% clay. | SC | | |
| 135 | | | | | Clayey SAND (SC); brown (7.5YR 4/4); moist; loose; 60% fine to very fine sand; 40% clay. | SC | | |
| 140 | | | | | Poorly graded SAND (SP); pinkish gray (5YR 6/2); dry; very loose; 95% coarse to fine sands; 5% fines. | SP | Top of Filter Pack; Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 145 | | | | | Well graded SAND with Gravel (SW); pinkish gray (7.5YR 6/2); 80% sand; 15% gravel to 2.5cm; angular to subrounded; 5% fines. | SW | | |
| 150 | | | | | Clayey SAND (SC); brown (7.5YR 4/4); moist; loose; 60% medium to very fine sand; 40% clay. | SC | | |

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# Borehole ID: KAFB-106140

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/10/2011
Date TD Reached: 1/12/2011
Date Completed: 1/20/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1472634.47
X Coordinate: 1542237.30

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Silty SAND (SM); brown (7.5YR 5/4); moist; loose; 70% sand to 3mm; 30% silt. | SM | Bottom of Screen | |
| 155 | | | | | Poorly graded SAND with Silt (SP-SM); light brown (7.5YR 6/3); moist; very loose; 90% medium to very fine sand; 10% silt. | SP-SM | | |
| 160 | | | | | Well graded SAND with Gravel (SW); gray (5YR 6/1); dry; very loose; 60% sand; 40% gravel to 30mm; angular to subrounded. | SW | Bentonite Seal | |
| 165 | | | | | Well graded SAND with Gravel (SW); gray (5YR 6/1); moist; very loose; 85% sand; 15% fine gravel to 9mm; subangular to subrounded. | | | |
| 170 | | | | | Silty SAND with Gravel (SM); reddish brown (5YR 4/4); moist; loose; 70% well graded sand; 15% gravel; some tuft clasts; 15% silt. | SM | | |
| 175 | | | | | Well graded SAND with Gravel (SW); brown (7.5YR 4/4); 80% sand; 20% gravel to 7mm; rounded; tuft clasts. | SW | | |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106140

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/10/2011
Date TD Reached: 1/12/2011
Date Completed: 1/20/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1472634.47
X Coordinate: 1542237.30

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Poorly graded SAND (SP); pinkish gray (7.5YR 7/2); moist; very loose; 95% coarse to fine sand; 5% fines. | SP | Bentonite Seal | |
| 185 | | | | | Well graded SAND (SW); light gray (2.5YR 7/1); dry to moist; 90% sand; 5% gravel to 11mm; subangular to subrounded; 5% fines. | SW | Native Backfill | |
| 190 | | | | | Well graded SAND (SW); light brownish gray (2.5Y 6/2); moist; very loose; 90% sand; 10% gravel to 12mm; trace fines. | | | |
| 195 | | | | | Poorly graded SAND (SP); pinkish gray (5YR 7/2); dry; very loose; 95% coarse to fine sand; 5% fines. | SP | Bentonite Seal | |
| 200 | | | | | Well graded SAND (SW); light brown (7.5YR 6/3); dry; very loose; 95% sand; 5% fines. | SW | Native Backfill | |
| 205 | | | | | Poorly graded SAND (SP); light reddish brown (5YR 6/4); dry; very loose; 95% fine to very fine sand; 5% fines. | SP | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106140

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/10/2011
Date TD Reached: 1/12/2011
Date Completed: 1/20/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1472634.47
X Coordinate: 1542237.30

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND (SW); light gray (5YR 6/1); moist; very loose; 90% sand; 5% gravel to 17mm; subrounded to rounded; 5% fines. | | | |
| 215 | | | | | Well graded SAND with Gravel (SW); gray (5YR 6/1); 85% sand; 15% gravel to 17mm; angular to subrounded; trace fines. | SW | Native Backfill | |
| 220 | | | | | Poorly graded SAND with Gravel (SP); reddish gray (2.5YR 5/1); dry to moist; loose; 80% very coarse to coarse sand; 20% gravel to 30mm; subangular to subrounded. | SP | Bentonite Seal | |
| 225 | | | | | Well graded SAND (SW); gray (5YR 5/1); dry; very loose; 100% sand to 5mm. | SW | Native Backfill | |
| 230 | | | | | Poorly graded SAND (SP); pink (5YR 7/3); damp; very loose; 95% coarse to fine sand; 5% fines. | SP | | |
| 235 | | | | | Well graded SAND with Gravel (SW); pinkish gray (7.5YR 7/2); dry; very loose; 80% sand; 15% gravel to 22mm; angular to rounded; mostly tuft clasts; 5% fines. | SW | Bentonite Seal | |
| 240 | | | | | Poorly graded SAND (SP); pink (5YR 7/3); 95% coarse to fine sand; 5% gravel to 5mm; subrounded. | SP | Top of Filter Pack | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/21/11 17:23 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106140

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/10/2011
Date TD Reached: 1/12/2011
Date Completed: 1/20/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1472634.47
X Coordinate: 1542237.30

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND with Gravel (SW); light gray (5YR 7/1); dry; very loose; 85% sand; 15% gravel to 10mm; subangular to subrounded. Well graded SAND with Gravel (SW); light gray (5YR 7/1); dry; very loose; 60% sand; 40% gravel to 15mm; angular to rounded. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 245 | | | | | | | | |
| 250 | | | | | Silty SAND (SM); light brown (7.5YR 6/4); moist; loose; 60% medium to very fine sand; 5% gravel to 40mm; subangular to subrounded; 35% silt. | | Bottom of Screen | |
| 255 | | | | | Silty SAND (SM); light brown (7.5YR 6/4); moist; loose; 70% medium to very fine sand; 30% silt. | | | |
| 260 | | | | | Same as above (255 ft); 80% medium to very fine sand; 20% silt. | SM | | |
| | | | | | | | Bentonite Seal | |
| 265 | | | | | Poorly graded SAND with Silt (SP); brown (7.5YR 7/3); moist; loose; 90% medium to very coarse sand; trace gravel to 7mm; 10% silt. | | | |
| 270 | | | | | | | | |

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**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/10/2011
Date TD Reached: 1/12/2011
Date Completed: 1/20/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1472634.47
X Coordinate: 1542237.30

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND (SP); pinkish gray (7.5YR 7/2); moist; very loose; 95% coarse to fine sand; 5% fines. | | | |
| 275 | | | | | Same as above (270 ft). | SP | | |
| 280 | | | | | Poorly graded SAND (SP); pinkish gray (5YR 6/2); moist; very loose; 95% very coarse to medium sand; 5% fines. | | | |
| 285 | | | | | Well graded SAND with Silt (SW-SM); pinkish gray (5YR 7/2); moist; loose; 85% sand; 5% gravel; angular to subrounded; 10% silt. | SW-SM | Bentonite Seal | |
| 290 | | | | | Poorly graded SAND with Silt (SP-SM); light brown (7.5YR 6/4); 90% coarse to fine sand; 10% silt. | SP-SM | | |
| 295 | | | | | Clayey SAND (SC); reddish brown (7.5YR 6/6); 80% fine sand; 20% clay. | SC | | |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/21/11 17:23 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106140

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/10/2011
Date TD Reached: 1/12/2011
Date Completed: 1/20/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1472634.47
X Coordinate: 1542237.30

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded SAND with Gravel (SW); brownish yellow (10YR 6/6); moist; very loose; 80% sand; 15% gravel to 20mm; subangular to subrounded; 5% fines. | | | |
| 305 | | | | | Well graded SAND (SW); very pale brown (10YR 7/3); moist; very loose; 95% sand; 5% gravel; subrounded. | SW | | |
| 310 | | | | | Well graded GRAVEL with Sand (GW); pinkish gray (7.5YR 6/2); moist; very loose; 55% gravel to 45mm; 40% sand; angular to subrounded; 5% fines. | GW | | |
| 315 | | | | | Well graded SAND with Gravel (SW); pinkish gray (7.5YR 6/2); dry; very loose; 80% sand; 20% gravel to 20mm; subangular to subrounded. | SW | Bentonite Seal | |
| 320 | | | | | Poorly graded SAND (SP); pink (7.5YR 7/3); 95% coarse to medium sand; 5% fines. | | | |
| 325 | | | | | Poorly graded SAND with Gravel (SP); light pinkish brown gray (10YR 6/2); dry; loose; 80% coarse to fine sand; 15% gravel to 11mm; angular to rounded; 5% fines. | SP | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/21/11 17:23 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106140

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/10/2011
Date TD Reached: 1/12/2011
Date Completed: 1/20/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1472634.47
X Coordinate: 1542237.30

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/3); dry; very loose; 80% sand; 20% gravel to 35mm; angular to subrounded. | SW | Bentonite Seal | |
| 335 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); moist; very loose; 95% medium to very fine sand; 5% gravel to 12mm. | | Top of Filter Pack | |
| 340 | | | | | Same as above (335 ft). | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 345 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; very loose; 95% medium to very fine sand; 5% gravel. | SP | | |
| 350 | | | | | Poorly graded SAND with Gravel (SP); pinkish gray (7.5YR 6/2); dry; very loose; 80% fine to coarse sand; 20% gravel to 12mm; angular to subrounded. | | Bottom of Screen | Asked driller to slow down @ 1440. |
| 355 | | | | | Poorly graded SAND (SP); pinkish gray (7.5YR 7/2); dry; very loose; 95% medium to fine sand; 5% fines. | | Bentonite Seal | |
| 360 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/21/11 17:23 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106140

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/10/2011
Date TD Reached: 1/12/2011
Date Completed: 1/20/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1472634.47
X Coordinate: 1542237.30

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; very loose; 95% coarse to medium sand; 5% fines. | | | |
| 365 | | | | | Same as above (360 ft); 95% medium to fine sand. | SP | | |
| 370 | | | | | Poorly graded SAND with Silt (SP-SM); light brown (7.5YR 6/3); moist; very loose; 90% coarse to medium sand; 10% silt. | SP-SM | | |
| 375 | | | | | Well graded SAND (SW); brown (7.5YR 5/3); dry; loose; 95% sand; 5% fines. | | Bentonite Seal | |
| 380 | | | | | Well graded SAND with Gravel (SW); reddish brown (5YR 5/3); moist; very loose; 80% sand; 15% gravel to 10mm; subangular to subrounded; 5% fines. | SW | | |
| 385 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); dry to moist; very loose; 95% coarse to fine sand; 5% fines. | SP | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106140

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/10/2011
Date TD Reached: 1/12/2011
Date Completed: 1/20/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1472634.47
X Coordinate: 1542237.30

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND with Gravel (SP); reddish brown (5YR 4/3); moist; loose; 80% coarse to fine sand; 15% gravel to 11mm; angular to subrounded; 5% fines. | | | |
| 395 | | | | | Poorly Graded SAND (SP); light reddish brown (5YR 6/3); moist; very loose; 95% medium to very fine sand; 5% fines. | SP | | |
| 400 | | | | | Same as above (395 ft); fine to medium sand. | | | |
| 405 | | | | | Well graded SAND (SW); brown (5YR 5/3); moist; very loose; 95% sand; 5% fines. | SW | Bentonite Seal | |
| 410 | | | | | Poorly graded SAND (SP); light reddish brown (5YR 6/3); moist; very loose; 95% fine to medium sand; 5% fines. | | | |
| 415 | | | | | Poorly graded SAND (SP); pinkish gray (5YR 7/2); moist; very loose; 95% fine to medium sand; 5% fines. | SP | | |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106140

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/10/2011
Date TD Reached: 1/12/2011
Date Completed: 1/20/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1472634.47
X Coordinate: 1542237.30

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND (SP); pinkish gray (5YR 7/2); moist; very loose; 95% fine to medium sand; 5% fines. | SP | | |
| 425 | | | | | Poorly graded SAND (SP); pink (7.5YR 7/3); moist; very loose; 95% coarse to medium sand; 5% fines. | | Bentonite Seal | |
| 430 | | | | | Poorly graded SAND (SP); pink (7.5YR 7/3); moist; very loose; 95% very coarse to fine sand; 5% fines. | | | |
| 435 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/3); moist; very loose; 95% very coarse to medium sand; 5% fines. | | Top of Filter Pack | |
| 440 | | | | | Same as above (435 ft). | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 445 | | | | | Same as above (435 ft). | | | |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106140

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 1/10/2011
Date TD Reached: 1/12/2011
Date Completed: 1/20/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1472634.47
X Coordinate: 1542237.30

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/3); moist; very loose; 95% very coarse to medium sand; 5% fines. | SP | Bottom of Screen | |
| 455 | | | | | Lean CLAY (CL); moist; firm; high plasticity; 90% clay; 10% sand. | CL | | |
| | | | | | Poorly graded SAND (SP); dry, very loose; 95% medium to fine sand; 5% fines. | SP | | Total depth = 458 ft. Reached @1630 on 1/12/11. |
| 460 | | | | | | | | Water added during drilling (gallons) = 0 |
| 465 | | | | | | | | Water added during construction (gallons) = Not Recorded |
| 470 | | | | | | | | |
| 475 | | | | | | | | |
| 480 | | | | | | | | |

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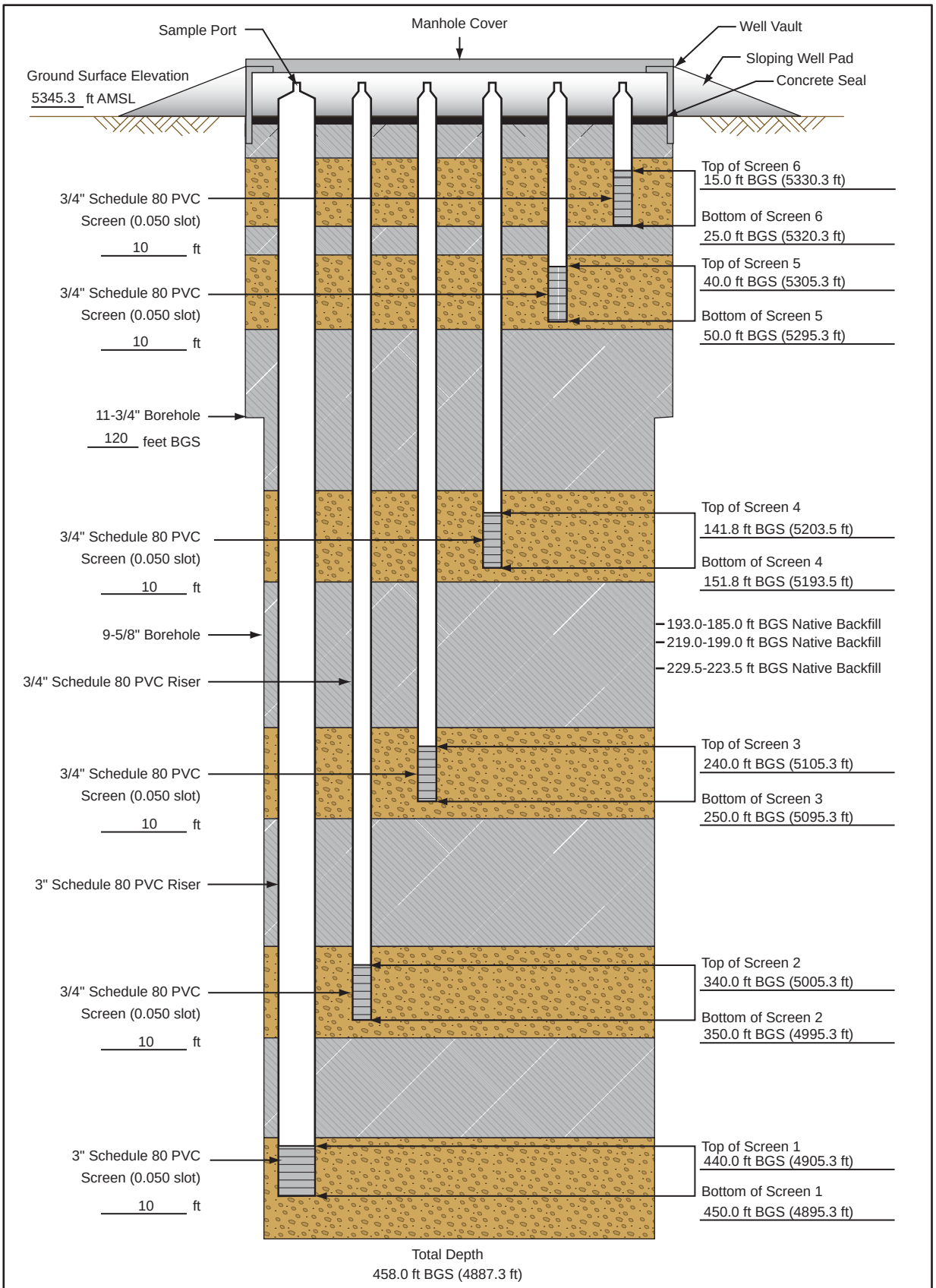
# Nested Soil Vapor Well Completion Diagram for KAFB-106140

Installation Start Date/Time: 1/13/2011 @ 09:10
Installation End Date/Time: 1/20/2011 @ 13:05



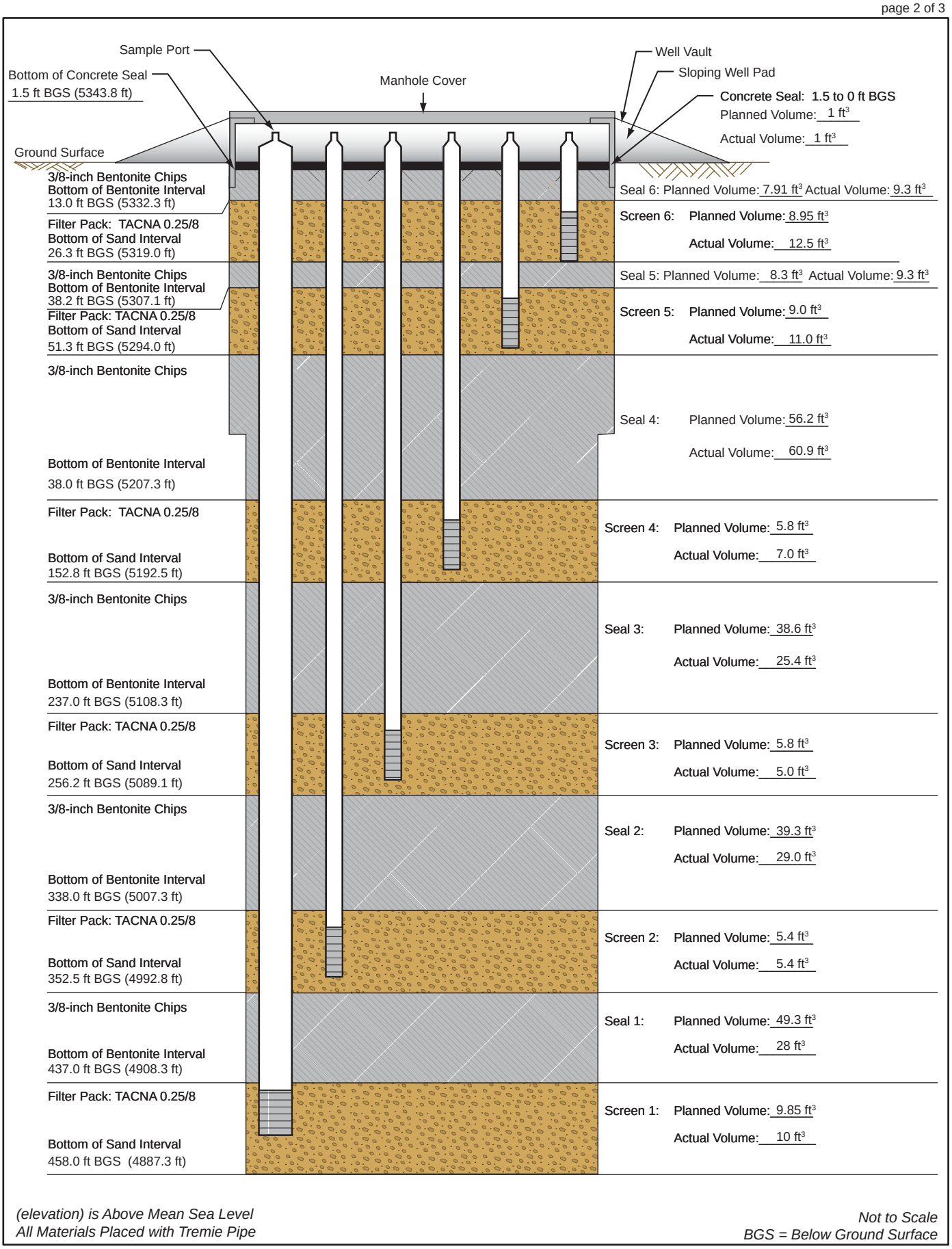



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106140






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

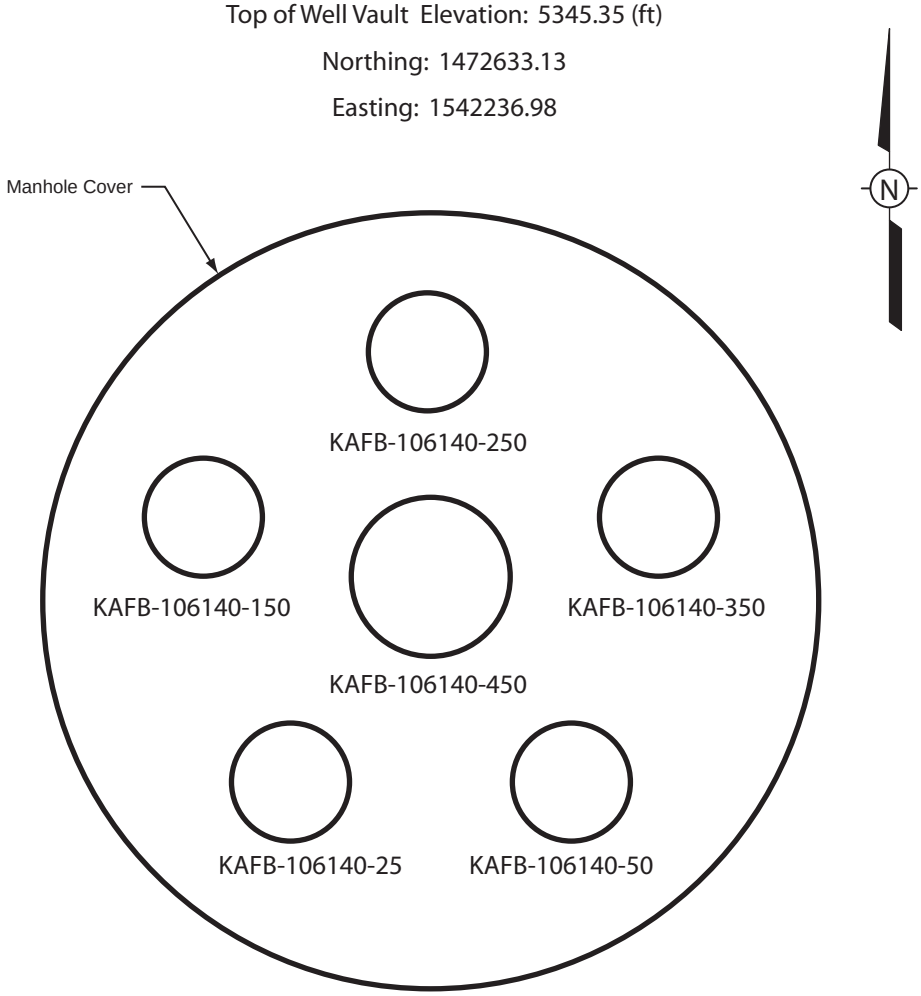
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106140



Top of Well Vault Elevation: 5345.35 (ft)

Northing: 1472633.13

Easting: 1542236.98




| Well Number | Well Diameter | Well Depth | Screened Interval | Northing | Easting | Elevation |
|---|---|---|---|---|---|---|
| KAFB-106140-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1,472,632.54 | 1,542,236.62 | 5,345.0 |
| KAFB-106140-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1,472,632.40 | 1,542,236.96 | 5,345.0 |
| KAFB-106140-150 | 3/4 | 151.8 | 141.8 - 151.8 | 1,472,632.87 | 1,542,236.66 | 5,345.0 |
| KAFB-106140-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1,472,632.93 | 1,542,236.96 | 5,345.0 |
| KAFB-106140-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1,472,632.68 | 1,542,237.19 | 5,345.1 |
| KAFB-106140-450 | 3 | 450.0 | 440.0 - 450.0 | 1,472,632.75 | 1,542,236.88 | 5,344.9 |

# Borehole ID: KAFB-106141

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/5/2011
Date TD Reached: 4/7/2011
Date Completed: 4/15/2011

Ground Elevation AMSL (ft): 5334.4
Y Coordinate: 1475345.59
X Coordinate: 1542471.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | SILT with Sand (ML); light reddish brown (5YR 6/4); dry; 85% silt; trace clay; 15% coarse sand; no odor. | ML | Concrete Seal | Hand augered.<br>***Note: no headspace requirement at this location.*** |
| 5 | | | | | Lean CLAY (CL); yellowish red (5YR 5/6); moist; soft; medium plasticity; 75% clay; some cemented nodules; 25% silt; trace fine sand; no odor. | CL | Bentonite Seal | Began drilling @ 1615 on 4/5/11. |
| 10 | | | | | SILT (ML); reddish brown (5YR 4/4); dry; soft; low plasticity; 65% silt; 35% clay nodules; no odor. | ML | Top of Filter Pack | |
| 15 | | | | | SILT (ML); yellowish red (5YR 4/6); dry; stiff; low plasticity; 75% silt; 25% clay nodules; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | New 20' connection @ 1630. |
| 20 | | | | | Same as above (15 ft); yellowish red (5YR 5/6); 65% silt; 35% clay nodules; no odor. | | | |
| 25 | | | | | Same as above (15 ft); 70% silt; 30% clay nodules; cemented; no odor. | | Bottom of Screen<br>Bentonite Seal | |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/31/11 11:36 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106141

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/5/2011
Date TD Reached: 4/7/2011
Date Completed: 4/15/2011

Ground Elevation AMSL (ft): 5334.4
Y Coordinate: 1475345.59
X Coordinate: 1542471.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); reddish yellow (5YR 6/6); dry; stiff; low plasticity; 60% silt; 40% clay nodules; no odor. | ML | | |
| 35 | | | | | SILT with Sand (ML); yellowish red (5YR 5/6); dry; 70% silt; 15% clay nodules; cemented; 15% coarse sand; subrounded to rounded; no odor. | | Bentonite Seal | |
| 40 | | | | | SILT (ML); reddish yellow (5YR 6/6); dry; 100% silt; trace clay; trace coarse sand; no odor. | | | |
| 45 | | | | | Gravelly SILT (ML); yellowish red (5YR 4/6); dry; 60% silt; 30% fine gravel to 0.5in; angular to subrounded; 10% coarse sand; no odor. Note: gravel is granite and metamorphic. | | Top of Filter Pack | |
| 50 | | | | | Same as above (45 ft); 50% silt; 50% gravel. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Rig chatter @ 52'. |
| 55 | | | | | Sandy SILT with Gravel (ML); yellowish red (5YR 5/8); dry; 60% silt; 20% coarse sand; subangular to subrounded; 20% fine gravel to 0.125in; subangular to subrounded; no odor. | | | End of 4/5/11 @ 1705. New 20' connection and resumed drilling @ 0815 on 4/6/11. |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106141

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/5/2011
Date TD Reached: 4/7/2011
Date Completed: 4/15/2011

Ground Elevation AMSL (ft): 5334.4
Y Coordinate: 1475345.59
X Coordinate: 1542471.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT (ML); yellowish red (5YR 5/8); dry; soft; low plasticity; 60% silt; 40% clay nodules; no odor. | | Bottom of Screen | Water added to cyclone for dust suppression. |
| 65 | | | | | Same as above (60 ft); 70% silt; 20% clay nodules; 10% coarse sand; subangular to subrounded; no odor. | ML | | |
| 70 | | | | | Lean CLAY (CL); yellowish red (5YR 4/6); dry; soft; low plasticity; 70% clay nodules; 20% silt; 10% coarse sand with pumice fragments; subrounded; no odor. | CL | | |
| 75 | | | | | SILT (ML); yellowish red (5YR 5/6); dry; stiff; low plasticity; 70% silt; 30% clay nodules; trace pumice fragments; no odor. | | Bentonite Seal | New 20' connection @ 0840. |
| 80 | | | | | SILT (ML); yellowish red (5YR 5/6); dry; soft; low plasticity; 80% silt; 10% clay nodules; 10% coarse sand; subrounded; trace pumice fragments; no odor. | ML | | |
| 85 | | | | | SILT with Sand (ML); reddish yellow (5YR 6/6); dry; soft; low plasticity; 70% silt; 15% clay; 15% coarse sand with pumice fragments; no odor. | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106141

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/5/2011
Date TD Reached: 4/7/2011
Date Completed: 4/15/2011

Ground Elevation AMSL (ft): 5334.4
Y Coordinate: 1475345.59
X Coordinate: 1542471.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); yellowish red (5YR 5/6); dry; 70% silt; 30% clay nodules; trace coarse sand to fine gravel with pumice fragments; no odor. | ML | | |
| 95 | | | | | Lean CLAY (CL); strong brown (7.5YR 4/6); moist; soft; medium plasticity; 75% clay; 25% silt; no odor. | CL | | New 20' connection @ 0900. |
| 100 | | | | | Lean CLAY (CL); brown (7.5YR 4/4); moist; soft; medium plasticity; 100% clay nodules; trace coarse sand with pumice fragments; no odor. | | | |
| 105 | | | | | Same as above (100 ft); trace pumice fragments; no odor. | | Bentonite Seal | |
| 110 | | | | | Same as above (100 ft); strong brown (7.5YR 4/6); trace pumice fragments; no odor. | | | |
| 115 | | | | | Sandy lean CLAY (CL); yellowish red (5YR 4/6); moist; soft; medium plasticity; 60% clay; 40% coarse sand; subangular to subrounded; trace gravel; no odor. | | | New 20' connection @ 0920. |
| 120 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/31/11 11:36 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106141

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/5/2011
Date TD Reached: 4/7/2011
Date Completed: 4/15/2011

Ground Elevation AMSL (ft): 5334.4
Y Coordinate: 1475345.59
X Coordinate: 1542471.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Sandy lean CLAY (CL); yellowish red (5YR 4/6); moist; soft; medium plasticity; 70% clay; 30% coarse sand; subangular to subrounded; trace gravel; no odor. | | | |
| 125 | | | | | Lean CLAY (CL); yellowish red (5YR 5/6); moist; soft; low plasticity; 75% clay; 25% silt; trace pumice fragments; no odor. | CL | | |
| 130 | | | | | SILT (ML); strong brown (7.5YR 5/6); moist; soft; low plasticity; 55% silt; 45% clay nodules; trace pumice fragments; no odor. | | | |
| 135 | | | | | SILT (ML); strong brown (7.5YR 4/6); moist; soft; low plasticity; 60% silt; 30% clay nodules; 10% coarse sand and pumice fragments; no odor. | ML | Bentonite Seal | New 20' connection @ 0945. |
| 140 | | | | | Lean CLAY with Sand (CL); strong brown (7.5YR 4/6); moist; soft; low plasticity; 60% clay; 20% silt; 20% fine to coarse sand with pumice fragments; no odor. | | | |
| 145 | | | | | Lean CLAY with Sand (CL); strong brown (7.5YR 4/6); moist; soft; medium plasticity; 75% clay nodules; 25% fine to coarse sand with pumice fragments; subangular to subrounded; no odor. | CL | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106141

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/5/2011
Date TD Reached: 4/7/2011
Date Completed: 4/15/2011

Ground Elevation AMSL (ft): 5334.4
Y Coordinate: 1475345.59
X Coordinate: 1542471.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Clayey SAND (SC); yellowish brown (10YR 5/4); moist; 60% coarse sand with pumice fragments; subrounded; 10% fine gravel to 1in; subangular to subrounded; 30% clay nodules; soft; medium plasticity; no odor. Note: gravel is metamorphic. | SC | Bentonite Seal | |
| 155 | | | | | Poorly graded SAND (SP); light yellowish brown (10YR 6/4); moist; 100% fine to medium sand; subrounded to rounded; trace gravel; no odor. | SP | Top of Filter Pack | Added short connection @ 1005. |
| 160 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); dry; 90% fine to coarse sand with pumice fragments; subangular to subrounded; 10% fine gravel to 0.5in; angular to subrounded; trace clay; no odor. Note: gravel is granite and metamorphic. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Total depth with 11-3/4" casing. Resumed drilling @ 1320 with 9-5/8" casing. Approximate top of Santa Fe Group. |
| 165 | | | | | Well graded SAND with Gravel (SW); light yellowish brown (10YR 6/4); dry; 80% fine to coarse sand with pumice fragments; subrounded to rounded; 20% fine gravel; angular to subrounded; no odor. | | | |
| 170 | | | | | Well graded SAND (SW); light yellowish brown (10YR 6/4); dry; 90% fine to coarse sand; subrounded to rounded; 10% fine gravel to 0.5in; angular to subrounded; trace pumice fragments; no odor. Note: gravel is metamorphic. | | Bottom of Screen | |
| 175 | | | | | Well graded SAND with Clay and Gravel (SW-SC); light yellowish brown (10YR 6/4); dry; 60% fine to coarse sand; subangular to subrounded; 30% fine gravel to 0.75in; subrounded to rounded; 10% clay nodules; stiff; low plasticity; no odor. Note: gravel is metamorphic. | SW-SC | Bentonite Seal | New 20' connection @ 1335. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106141

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/5/2011
Date TD Reached: 4/7/2011
Date Completed: 4/15/2011

Ground Elevation AMSL (ft): 5334.4
Y Coordinate: 1475345.59
X Coordinate: 1542471.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND with Gravel (SW); light yellowish brown (10YR 6/4); dry; 75% fine to coarse sand; subrounded to rounded; 25% fine gravel to 0.25in; subangular to subrounded; no odor. Note: gravel is metamorphic. | SW | | |
| 185 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); moist; 100% fine sand; no odor. | SP | | |
| 190 | | | | | Well graded SAND with Gravel (SW); light yellowish brown (10YR 6/4); moist; 85% fine to coarse sand with pumice fragments; subrounded to rounded; 15% gravel to 0.25in; subrounded to rounded; no odor. Note: gravel is metamorphic. | SW | | |
| 195 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); moist; 85% fine sand; 15% coarse sand with pumice fragments; subrounded to rounded; no odor. | SP | Bentonite Seal | New 20' connection @ 1350. |
| 200 | | | | | Well graded SAND with Gravel (SW); pale brown (10YR 6/3); dry; 85% fine to coarse sand with pumice fragments; subangular to rounded; 15% fine gravel to 0.125in; subrounded to rounded; no odor. | SW | | |
| 205 | | | | | Well graded SAND with Gravel (SW); pale brown (10YR 6/3); dry; 75% fine to coarse sand; subrounded to rounded; 25% fine gravel to 0.5in; subangular to subrounded; no odor. Note: gravel is granite and metamorphic. | | | |
| 210 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 5/31/11 11:36 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106141

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/5/2011
Date TD Reached: 4/7/2011
Date Completed: 4/15/2011

Ground Elevation AMSL (ft): 5334.4
Y Coordinate: 1475345.59
X Coordinate: 1542471.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded GRAVEL with Sand (GW); various colors; dry; 65% fine gravel to 1.5in; angular to subrounded; 35% fine to coarse sand with pumice fragments; subrounded to rounded; no odor. Note: gravel is metamorphic. | GW | | |
| 215 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); moist; 100% fine to coarse sand; subrounded to rounded; no odor. | SW | | |
| 220 | | | | | Lean CLAY (CL); dark yellowish brown (10YR 4/4); moist; soft; medium plasticity; 100% clay nodules; no odor. | CL | | New 20' connection @ 1405. |
| 225 | | | | | Poorly graded GRAVEL with Sand (GP); various colors; dry; 75% fine gravel to 0.5in; subangular to subrounded; 25% fine to coarse sand; subrounded to rounded; no odor. Note: gravel is granite and metamorphic with pumice fragments. | GP | Bentonite Seal | |
| 230 | | | | | Well graded SAND with Gravel (SW); yellowish brown (10YR 5/4); dry; 75% fine to coarse sand; subrounded to rounded; 25% fine gravel to 0.5in; subangular to subrounded; no odor. Note: gravel is granite and metamorphic. Same as above (225 ft); 65% sand; 35% fine gravel to 1in; angular to subrounded; no odor. Note: gravel is metamorphic. | SW | | |
| 235 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); moist; 100% fine to coarse sand with pumice fragments; subrounded to rounded; no odor. | | Top of Filter Pack | New 20' connection @ 1425. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106141

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/5/2011
Date TD Reached: 4/7/2011
Date Completed: 4/15/2011

Ground Elevation AMSL (ft): 5334.4
Y Coordinate: 1475345.59
X Coordinate: 1542471.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND with Gravel (SW); yellowish brown (10YR 5/4); moist; 55% fine to coarse sand; subrounded to rounded; 45% gravel to 0.125in; angular to subrounded; no odor. Note: gravel is granite and metamorphic. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Rig chatter 240-260'. |
| 245 | | | | | Well graded SAND with Gravel (SW); light yellowish brown (10YR 6/4); moist; 70% fine to coarse sand; subrounded to rounded; 30% fine gravel to 1in; angular to subrounded; no odor. Note: gravel is metamorphic. | | | |
| 250 | | | | | Same as above (245 ft); fine gravel to 0.5in; no odor. Note gravel is granite and metamorphic. | SW | Bottom of Screen | |
| 255 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); moist; 100% fine to coarse sand; subrounded to rounded; no odor. | | | New 20' connection @ 1435. |
| 260 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); moist; 100% fine to medium sand; subrounded to rounded; no odor. | SP | Bentonite Seal | |
| 265 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); moist; 70% fine sand; 30% medium to coarse sand; subrounded to rounded; trace fine gravel; no odor. | SW | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106141

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/5/2011
Date TD Reached: 4/7/2011
Date Completed: 4/15/2011

Ground Elevation AMSL (ft): 5334.4
Y Coordinate: 1475345.59
X Coordinate: 1542471.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Lean CLAY (CL); brown (7.5YR 5/4); moist; soft to stiff; low to medium plasticity; 100% clay nodules; no odor. | CL | | |
| 275 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); dry; 100% fine to coarse sand; subrounded to rounded; no odor. | SW | | New 20' connection @ 1450. |
| 280 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; 60% coarse sand; subrounded to rounded; 40% fine to medium sand; no odor. | | | |
| 285 | | | | | Same as above (280 ft); trace fine gravel; no odor. | | Bentonite Seal | |
| 290 | | | | | Poorly graded GRAVEL with Sand (GP); various colors; moist; 75% fine gravel to 0.5in; subangular to rounded; 25% fine to coarse sand; subrounded to rounded; no odor. Note: gravel is granite, limestone, and metamorphic. | GP | | |
| 295 | | | | | Poorly graded GRAVEL with Sand (GP); yellowish brown (10YR 5/4); dry; 50% gravel to 0.125in; subangular to rounded; 50% fine to coarse sand; subrounded to rounded; no odor. Note: gravel is granite and metamorphic. | | | New 20' connection @ 1510. |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106141

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/5/2011
Date TD Reached: 4/7/2011
Date Completed: 4/15/2011

Ground Elevation AMSL (ft): 5334.4
Y Coordinate: 1475345.59
X Coordinate: 1542471.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded GRAVEL with Sand (GW); yellowish brown (10YR 5/4); dry; 70% fine gravel to 0.75in; angular to subrounded; 30% fine to coarse sand; subangular to rounded; no odor. Note: gravel is granite and metamorphic. | | | |
| 305 | | | | | Well graded GRAVEL (GW); various colors; moist; 90% fine gravel to 1.5in; angular to rounded; 10% fine to coarse sand; subrounded to rounded; no odor. Note: gravel is granite and metamorphic. | GW | | Rig chatter 305-315'. |
| 310 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); moist; 60% fine to coarse sand; subrounded to rounded; 40% fine gravel to 1in; angular to rounded; no odor. Note gravel is granite and metamorphic. | | | |
| 315 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; 100% fine to medium sand; trace coarse sand; subrounded to rounded; no odor. | | Bentonite Seal | New 20' connection @ 1530. |
| 320 | | | | | Same as above (315 ft); 100% fine to coarse sand; no odor. | SW | | |
| 325 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; 50% coarse sand; 40% fine to medium sand; subrounded to rounded; 10% gravel to 0.125in; subangular to subrounded; no odor. | | | Rig chatter @ 325'. |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106141

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/5/2011
Date TD Reached: 4/7/2011
Date Completed: 4/15/2011

Ground Elevation AMSL (ft): 5334.4
Y Coordinate: 1475345.59
X Coordinate: 1542471.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/6); moist; 90% fine to coarse sand; subrounded to rounded; 10% gravel to 0.125in; subangular to subrounded; slight sweet odor. | | Bentonite Seal | |
| 335 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; 100% fine to coarse sand; subangular to subrounded; no odor. | SW | Top of Filter Pack | New 20' connection @ 1550. |
| 340 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; 100% fine sand; subrounded to rounded; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 345 | | | | | Same as above (340 ft); no odor. | SP | | |
| 350 | | | | | Well graded SAND with Gravel (SW); yellowish brown (10YR 5/4); moist; 65% fine to coarse sand; subrounded to rounded; 35% gravel to 0.125in; subangular to subrounded; no odor. Note: gravel is granite and metamorphic. | | Bottom of Screen | |
| 355 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); moist; 65% fine to coarse sand; subrounded to rounded; 35% fine gravel to 0.5in; subangular to subrounded; sweet odor. Note: gravel is granite and metamorphic. | SW | Bentonite Seal | New 20' connection @ 1605. |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106141

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/5/2011
Date TD Reached: 4/7/2011
Date Completed: 4/15/2011

Ground Elevation AMSL (ft): 5334.4
Y Coordinate: 1475345.59
X Coordinate: 1542471.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded GRAVEL with Sand (GW); brown (10YR 5/3); dry; 65% fine gravel to 1.5in; angular to subrounded; 35% fine to coarse sand; subangular to rounded; sweet odor. Note: gravel is granite and metamorphic. | GW | | |
| 365 | | | | | Well graded GRAVEL (GW); various colors; moist; 95% fine gravel to 1.5in; angular to rounded; 5% sand; sweet odor. Note: gravel is granite and metamorphic. | | | |
| 370 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; 100% fine to coarse sand; subangular to rounded; trace gravel to 0.125in; sweet odor. | SW | Bentonite Seal | New 20' connection @ 1625. |
| 375 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; 100% fine to coarse sand; subangular to rounded; no odor. | | | |
| 380 | | | | | Well graded GRAVEL with Sand (GW); various colors; moist; 85% fine gravel to 0.75in; angular to subrounded; 15% medium to coarse sand; subrounded to rounded; slight sweet odor. Note gravel is granite, limestone, and metamorphic. | GW | | |
| 385 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; 70% fine sand; 30% medium to coarse sand; subrounded to rounded; slight sweet odor. | SP | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106141

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/5/2011
Date TD Reached: 4/7/2011
Date Completed: 4/15/2011

Ground Elevation AMSL (ft): 5334.4
Y Coordinate: 1475345.59
X Coordinate: 1542471.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; 80% fine sand; 20% medium to coarse sand; subrounded to rounded; slight sweet odor. | | | |
| 395 | | | | | Poorly graded SAND (SP); light yellowish brown (10YR 6/4); moist; 100% fine sand; trace gravel; no odor. | SP | | New 20' connection @ 1645. |
| 400 | | | | | Same as above (395 ft); no gravel; no odor. | | | |
| 405 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; 100% fine to coarse sand; subangular to subrounded; no odor. | | Bentonite Seal | |
| 410 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; 100% fine to coarse sand; subrounded to rounded; slight sweet odor. | SW | | |
| 415 | | | | | Same as above (410 ft); 100% fine to coarse sand; trace gravel to 0.125in; trace clay; slight sweet odor. | | | Stopped drilling @ 1700. End of 4/6/11. New 20' connection and resumed drilling @ 0810 on 4/7/11. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106141

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/5/2011
Date TD Reached: 4/7/2011
Date Completed: 4/15/2011

Ground Elevation AMSL (ft): 5334.4
Y Coordinate: 1475345.59
X Coordinate: 1542471.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; 50% fine to medium sand; 50% coarse sand; subangular to rounded; slight sweet odor. | SW | | |
| 425 | | | | | Silty SAND (SM); brown (10YR 5/3); dry; 70% fine to coarse sand; subangular to rounded; 10% gravel to 0.125in; subangular to rounded; 20% silt; slight sweet odor. | SM | Bentonite Seal | |
| 430 | | | | | Poorly graded SAND with Gravel (SP); dark yellowish brown (10YR 4/4); moist; 50% medium to coarse sand; subrounded to rounded; 50% fine gravel to 0.75in; anuglar to rounded; slight sweet odor. Note: gravel is granite and metamorphic. | SP | | |
| 435 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; 100% fine to coarse sand; subangular to rounded; trace gravel to 0.125in; slight sweet odor. | SW | Top of Filter Pack | New 20' connection @ 0840. |
| 440 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; 100% fine to coarse sand; subangular to rounded; slight sweet odor. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 445 | | | | | Clayey SAND (SC); yellowish brown (10YR 5/4); moist; 80% fine sand; subrounded to rounded; 20% clay nodules; medium stiff; medium plasticity; slight sweet odor. | SC | | |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106141

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/5/2011
Date TD Reached: 4/7/2011
Date Completed: 4/15/2011

Ground Elevation AMSL (ft): 5334.4
Y Coordinate: 1475345.59
X Coordinate: 1542471.33

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | |
| | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; 100% fine to coarse sand; subangular to rounded; slight sweet odor. | SW | Bottom of Screen | |
| 455 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); moist; 80% fine sand; 20% medium sand; subrounded to rounded; slight sweet odor. | SP | Native Backfill | |
| 460 | | | | | | | | Total depth = 460 ft. Reached @ 0905 on 4/7/11. |
| 465 | | | | | | | | Water added during drilling (gallons) = 0 |
| 470 | | | | | | | | Water added after drilling (gallons) = 0 |
| 475 | | | | | | | | Water added during construction (gallons) = Not recorded |
| 480 | | | | | | | | |

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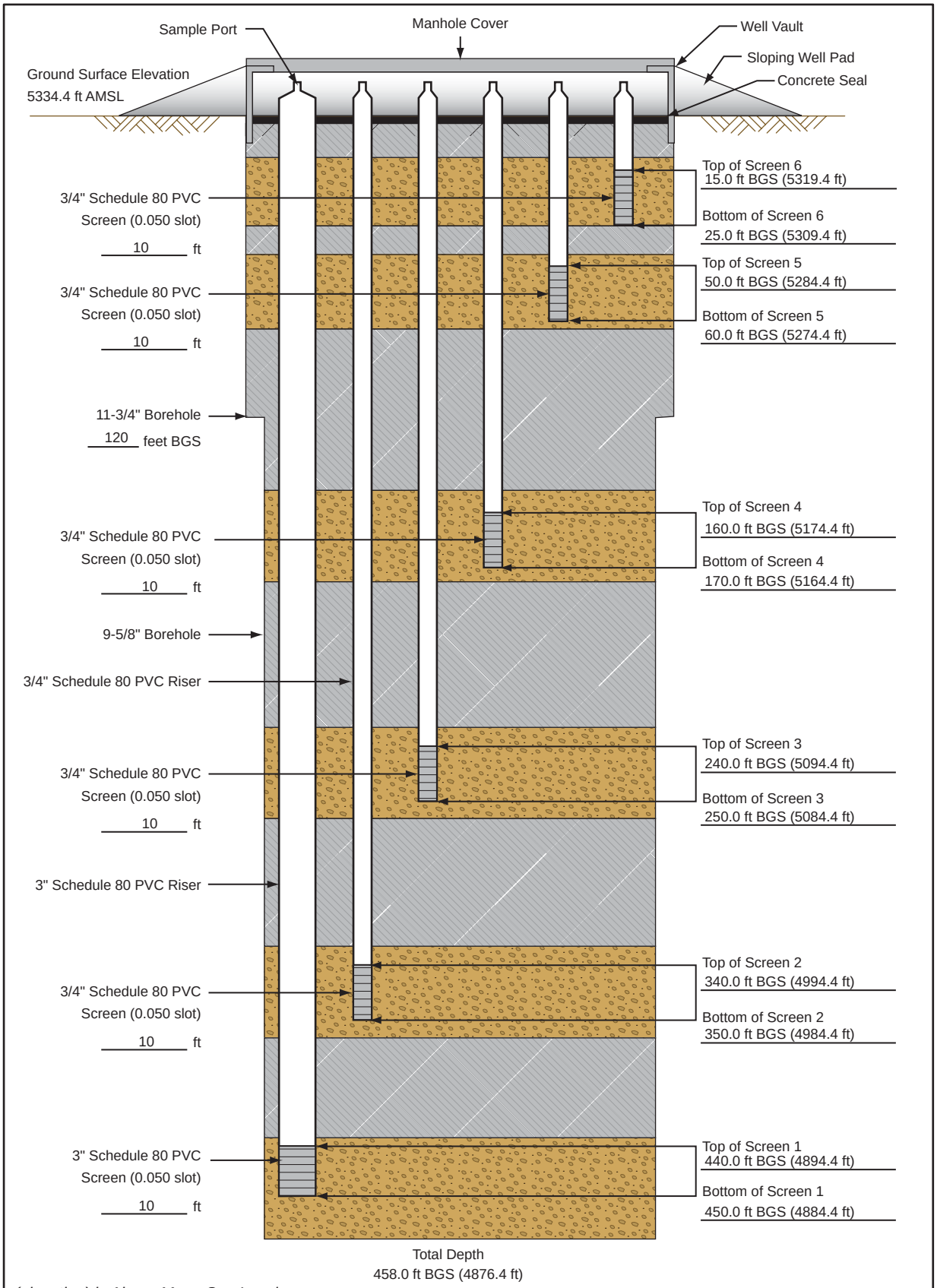
# Nested Soil Vapor Well Completion Diagram for KAFB-106141

Installation Start Date/Time: 4/12/2011 @ 13:00
Installation End Date/Time: 4/15/2011 @ 12:45



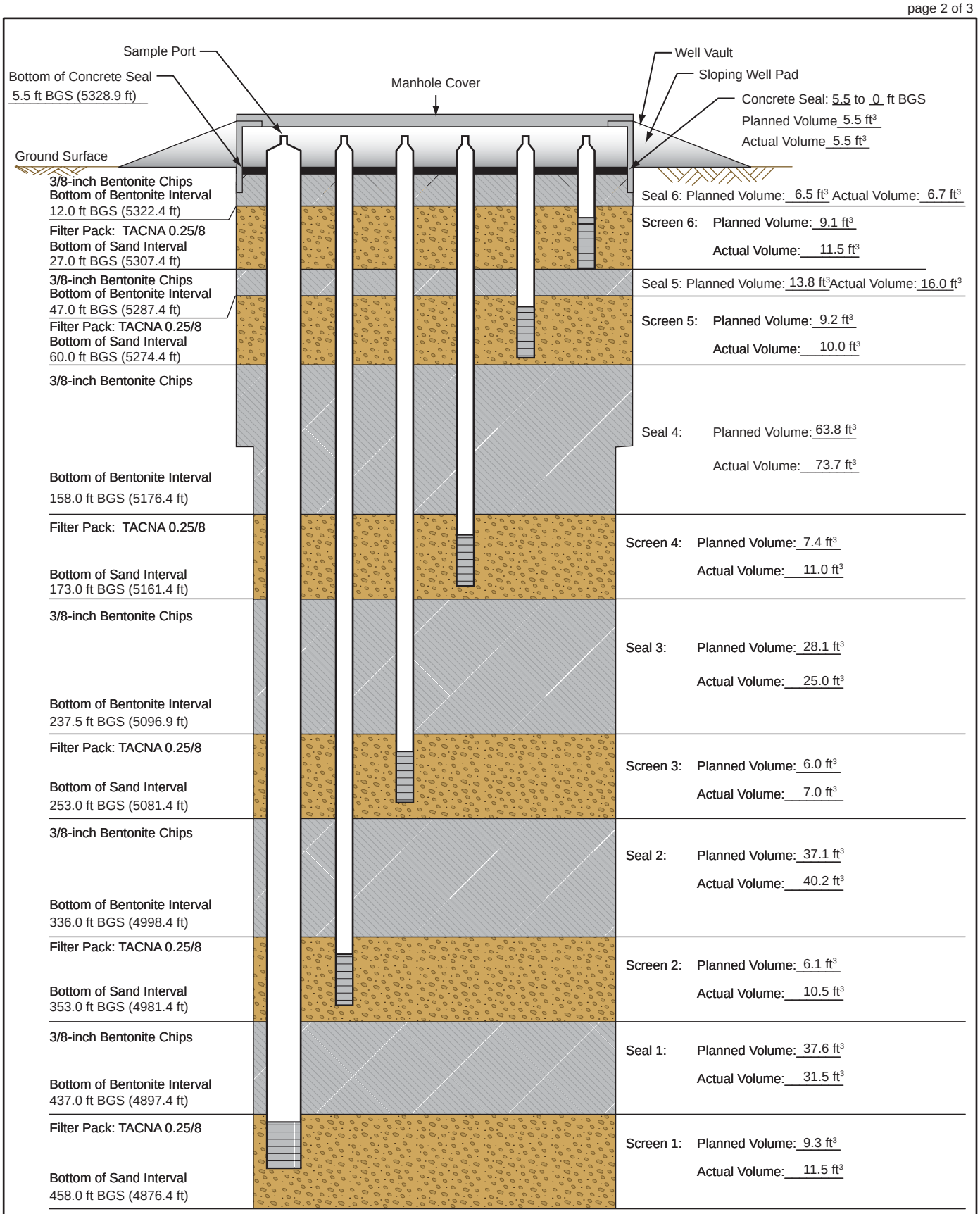



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106141






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

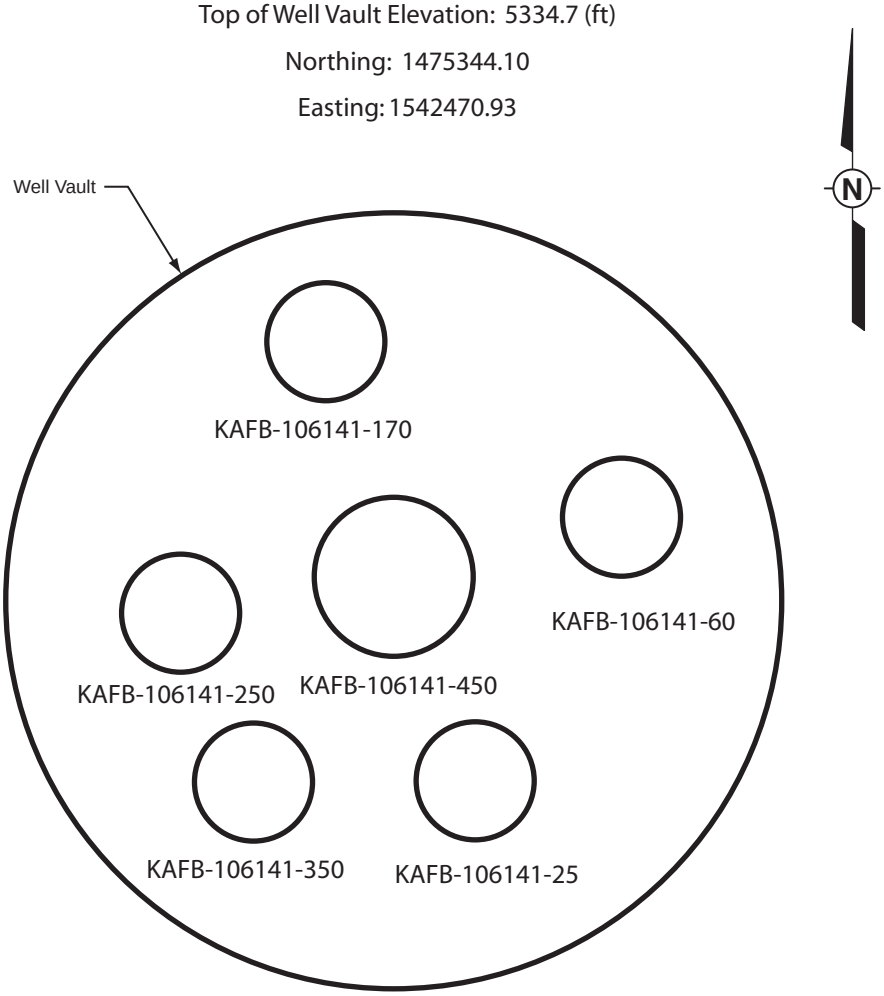
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106141



Top of Well Vault Elevation: 5334.7 (ft)

Northing: 1475344.10

Easting: 1542470.93




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106141-25 | 3/4 | 25.0 | 15.0 - 25.0 | 1475343.43 | 1542470.87 | 5334.2 |
| KAFB-106141-60 | 3/4 | 60.0 | 50.0 - 60.0 | 1475343.69 | 1542471.00 | 5334.2 |
| KAFB-106141-170 | 3/4 | 170.0 | 160.0 - 170.0 | 1475343.91 | 1542470.84 | 5334.2 |
| KAFB-106141-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1475343.81 | 1542470.55 | 5334.2 |
| KAFB-106141-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1475343.53 | 1542470.58 | 5334.2 |
| KAFB-106141-450 | 3 | 450.0 | 440.0 - 450.0 | 1475343.76 | 1542470.78 | 5334.2 |

# Borehole ID: KAFB-106142

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/15/2011
Date TD Reached: 4/17/2011
Date Completed: 4/21/2011

Ground Elevation AMSL (ft): 5349.2
Y Coordinate: 1474945.94
X Coordinate: 1542455.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Clayey SAND (SC); reddish brown (5YR 5/4); dry; 75% fine sand; trace coarse sand with pumice fragments; 25% clay; soft; low plasticity; no odor. | SC | Concrete Seal | Hand augered. ***Note: no headspace requirement at this location.*** |
| 5 | | | | | SILT (ML); yellowish red (5YR 5/8); dry; soft; low plasticity; 60% silt; 40% clay nodules; trace pumice fragments; no odor. | ML | | Began drilling @ 1650 on 4/15/11. |
| 10 | | | | | SILT (ML); yellowish red (5YR 4/6); dry; soft; low plasticity; 70% silt; 25% clay nodules; 5% fine sand; no odor. | ML | Bentonite Seal | |
| 15 | | | | | SILT (ML); yellowish red (5YR 4/6); moist; 100% silt; trace fine sand; no odor. | ML | Top of Filter Pack | New 20' connection @ 1720. End of 4/15/11. Resumed drilling @ 0800 on 4/16/11. |
| 20 | | | | | Lean CLAY with Gravel (CL); light reddish brown (5YR 6/4); wet; soft; medium plasticity; 75% clay; trace silt; 25% fine gravel to coarse sand; subrounded to rounded; no odor. | CL | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | Added water to cyclone for dust suppression @ 0810. |
| 25 | | | | | Well graded GRAVEL (GW); various colors; wet; 100% fine gravel to 1.5in; angular to subrounded; trace coarse sand; no odor. Note: gravel is granite and metamorphic. | GW | | Rig chatter @ 24-25'. Rig chatter @ 27-28'. |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 7/21/11 16:28 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106142

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/15/2011
Date TD Reached: 4/17/2011
Date Completed: 4/21/2011

Ground Elevation AMSL (ft): 5349.2
Y Coordinate: 1474945.94
X Coordinate: 1542455.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | | | | |
| | | | | | Well graded SAND with Gravel (SW); brown (7.5YR 4/3); wet; 75% fine to coarse sand; subrounded to rounded; 25% fine gravel to 1in; angular to subrounded; no odor. Note: gravel is granite and metamorphic. | SW | Bottom of Screen<br>Bentonite Seal | |
| 35 | | | | | | | | |
| | | | | | SILT (ML); reddish yellow (5YR 6/6); dry; stiff; low plasticity; 60% silt; 30% clay nodules; 10% fine gravel to 1in; angular to subrounded; no odor. | ML | Native Backfill<br>Top of Filter Pack | New 20' connection @ 0835. |
| 40 | | | | | SILT (ML); yellowish red (5YR 4/6); moist; stiff; low plasticity; 50% silt; 50% clay nodules; no odor. | | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 45 | | | | | | | | |
| | | | | | Sandy lean CLAY (CL); yellowish red (5YR 5/6); wet; soft; medium plasticity; 60% clay; some nodules; 40% coarse sand and gravel with pumice fragments; subangular to subrounded; no odor. | CL | | |
| 50 | | | | | Lean CLAY with Sand (CL); yellowish red (5YR 5/6); moist; soft; low plasticity; 80% clay nodules; 20% coarse sand and fine gravel to 0.25in; subangular to subrounded; no odor. | | Bottom of Screen | Rig chatter @ 50-53'. |
| 55 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); wet; 90% coarse sand; some medium sand; angular to subrounded; 10% fine gravel to 0.25in; angular to subrounded; no odor. Note: gravel is granite and metamorphic. | SP | Bentonite Seal | New 20' connection @ 0900. |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106142

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/15/2011
Date TD Reached: 4/17/2011
Date Completed: 4/21/2011

Ground Elevation AMSL (ft): 5349.2
Y Coordinate: 1474945.94
X Coordinate: 1542455.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT with Sand (ML); yellowish red (5YR 5/6); moist; 85% silt; 15% fine sand; trace coarse sand; no odor. | ML | | |
| 65 | | | | | SILT with Gravel (ML); yellowish red (5YR 4/6); moist; stiff; low plasticity; 50% silt; 35% clay nodules; 15% fine gravel to 1.5in; subangular to subrounded; trace coarse sand with pumice fragments; no odor. Note: gravel is granite and metamorphic. | | | |
| 70 | | | | | Well graded GRAVEL with Clay (GW-GC); strong brown (7.5YR 4/6); wet; 90% fine gravel to 1in; subrounded to rounded; trace sand; 10% clay; soft; low plasticity; no odor. Note: gravel is granite and metamorphic. | GW-GC | | |
| 75 | | | | | SILT (ML); yellowish red (5YR 4/6); moist; soft; low plasticity; 70% silt; 30% clay; no odor. | ML | Bentonite Seal | New 20' connection @ 0925. |
| 80 | | | | | Poorly graded SAND with Clay and Gravel (SP-SC); brown (7.5YR 5/4); wet; 70% coarse sand; subangular to subrounded; 20% fine gravel to 0.5in; subangular to subrounded; 10% clay; no odor. Note: gravel is granite and metamorphic. | SP-SC | | |
| 85 | | | | | Lean CLAY with Sand (CL); yellowish red (5YR 4/6); moist; soft to stiff; medium plasticity; 75% clay nodules; 25% medium to coarse sand; subangular to subrounded; no odor. | CL | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106142

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/15/2011
Date TD Reached: 4/17/2011
Date Completed: 4/21/2011

Ground Elevation AMSL (ft): 5349.2
Y Coordinate: 1474945.94
X Coordinate: 1542455.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Lean CLAY (CL); yellowish red (5YR 5/6); moist; soft to stiff; low to medium plasticity; 80% clay nodules; 20% silt; trace gravel to 0.75in; no odor. | | | |
| 95 | | | | | Same as above (90 ft); low plasticity; 70% clay nodules; 30% silt; trace gravel with pumice fragments; no odor. | CL | | New 20' connection @ 0940. |
| 100 | | | | | Gravelly lean CLAY (CL); strong brown (7.5YR 5/6); most; soft; low plasticity; 70% clay; 20% fine gravel with pumice fragments to 0.5in; subrounded to rounded; 10% coarse sand; no odor. | | | |
| 105 | | | | | SILT (ML); yellowish red (5YR 4/6); moist; soft to stiff; low plasticity; 85% silt; 15% clay nodules; trace coarse sand; no odor. | ML | Bentonite Seal | |
| 110 | | | | | Lean CLAY (CL); strong brown (7.5YR 5/6); moist; soft; low to medium plasticity; 60% clay; 30% silt; 10% coarse sand with pumice fragments; subangular to subrounded; no odor. | | | |
| 115 | | | | | Lean CLAY (CL); strong brown (7.5YR 5/6); moist; soft; medium plasticity; 75% clay nodules; 25% silt; no odor. | CL | | |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106142

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/15/2011
Date TD Reached: 4/17/2011
Date Completed: 4/21/2011

Ground Elevation AMSL (ft): 5349.2
Y Coordinate: 1474945.94
X Coordinate: 1542455.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT (ML); yellowish red (5YR 5/8); moist; 100% silt; trace fine sand; no odor. | ML | Bentonite Seal | Total depth with 11-3/4" casing @ 1225. Resumed drilling @ 1645 with 9-5/8" casing. |
| 125 | | | | | Lean CLAY (CL); reddish brown (5YR 5/4); moist; medium stiff; high plasticity; 100% clay nodules; trace fine sand; no odor. | CL | | |
| 130 | | | | | Lean CLAY (CL); yellowish red (5YR 4/6); moist; soft to medium stiff; high plasticity; 90% clay nodules; 10% coarse sand with pumice fragments; subangular to subrounded; no odor. | | Native Backfill | |
| 135 | | | | | Lean CLAY (CL); reddish brown (5YR 5/4); moist; soft; high plasticity; 100% clay nodules; trace pumice fragments; no odor. | | | New 20' connection @ 1705. End of 4/16/11. Resumed drilling @ 0815 on 4/17/11. |
| 140 | | | | | SILT (ML); strong brown (7.5YR 5/8); moist; soft; low plasticity; 85% silt; 10% clay nodules; 5% coarse sand to fine gravel with pumice fragments; no odor. | ML | | |
| 145 | | | | | SILT (ML); strong brown (7.5YR 5/6); moist; soft; medium plasticity; 70% silt; 30% clay; trace pumice fragments; no odor. | | Bentonite Seal | |
| 150 | | | | | | | | |

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**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/15/2011
Date TD Reached: 4/17/2011
Date Completed: 4/21/2011

Ground Elevation AMSL (ft): 5349.2
Y Coordinate: 1474945.94
X Coordinate: 1542455.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Poorly graded SAND with Silt (SP-SM); strong brown (7.5YR 5/6); moist; 90% fine sand; trace medium sand; subangular to subrounded; 10% silt; no odor. | SP-SM | Bentonite Seal | Added water to cyclone for dust suppression. Rig chatter @ 153-160'. |
| 155 | | | | | Poorly graded SAND with Clay (SP-SC); light yellowish brown (10YR 6/4); moist; 68% fine sand; 22% medium to coarse sand with pumice fragments; subangular to subrounded; 10% clay nodules; soft; medium plasticity; no odor. | SP-SC | Top of Filter Pack | Approximate top of Santa Fe Group. New 20' connection @ 0840. |
| 160 | | | | | Clayey SAND (SC); brown (7.5YR 5/4); moist; 85% fine to medium sand with trace pumice fragments; subrounded to rounded; 15% clay; soft; low plasticity; no odor. | SC | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 165 | | | | | Poorly graded SAND (SP); strong brown (7.5YR 4/6); moist; 90% fine sand; 10% medium sand; subrounded to rounded; trace pumice fragments; no odor. | SP | | |
| 170 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; 90% fine to coarse sand; subangular to rounded; 10% gravel to 0.125in; subangular to subrounded; no odor. | SW | Bottom of Screen | |
| 175 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); moist; 100% fine to coarse sand with pumice fragments; subangular to rounded; no odor. | | Bentonite Seal | New 20' connection @ 0905. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106142

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/15/2011
Date TD Reached: 4/17/2011
Date Completed: 4/21/2011

Ground Elevation AMSL (ft): 5349.2
Y Coordinate: 1474945.94
X Coordinate: 1542455.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; 80% fine sand; 20% medium to coarse sand with trace pumice fragments; subangular to rounded; no odor. | SP | | |
| 185 | | | | | | | | |
| | | | | | Well graded SAND with Silt (SW-SM); yellowish brown (10YR 5/4); wet; 90% fine to coarse sand with abundant pumice fragments; subrounded to rounded; 10% silt; no odor. | SW-SM | | Rig chatter @ 185-190'. |
| 190 | | | | | | | | |
| | | | | | Well graded GRAVEL with Sand (GW); various colors; wet; 70% gravel to 0.75in; subrounded to rounded; 30% coarse sand; subangular to rounded; no odor. Note: gravel is granite and metamorphic. | GW | | |
| 195 | | | | | | | Bentonite Seal | |
| | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); wet; 100% fine to coarse sand; subrounded to rounded; no odor. | | | New 20' connection @ 0925. |
| 200 | | | | | | | | |
| | | | | | Same as above (195 ft); 90% sand; 10% gravel with pumice fragments to 0.125in; no odor. | SW | | |
| 205 | | | | | | | | |
| | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); wet; 75% fine to coarse sand; subrounded to rounded; 25% gravel to 1in; angular to subangular; no odor. Note: gravel is metamorphic. | | | |
| 210 | | | | | | | | |

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**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/15/2011
Date TD Reached: 4/17/2011
Date Completed: 4/21/2011

Ground Elevation AMSL (ft): 5349.2
Y Coordinate: 1474945.94
X Coordinate: 1542455.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded GRAVEL with Sand (GW); dark yellowish brown (10YR 4/4); wet; 60% gravel to 1in; subangular to subrounded; 40% medium to coarse sand; subrounded to rounded; no odor. Note: gravel is metamorphic. | GW | | |
| 215 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry to moist; 100% fine to coarse sand; subangular to rounded; trace gravel; no odor. | SW | | New 20' connection @ 0935. |
| 220 | | | | | Well graded GRAVEL with Sand (GW); various colors; wet; 80% gravel to 1in; subangular to rounded; 20% coarse sand; subrounded to rounded; no odor. Note: gravel is granite and metamorphic. | GW | Bentonite Seal | |
| 225 | | | | | Well graded GRAVEL with Sand (GW); brown (10YR 5/3); wet; 60% gravel to 1.5in; angular to rounded; 40% fine to coarse sand; subrounded to rounded; trace silt; no odor. Note: gravel is metamorphic. | | | |
| 230 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); wet; 70% fine to coarse sand; subrounded to rounded; 30% gravel to 2in; angular to rounded; no odor. Note: gravel is metamorphic. | SW | | |
| 235 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); moist; 90% fine sand; trace coarse sand; subrounded to rounded; 10% gravel to 0.25in; angular to subrounded; no odor. | SP | Top of Filter Pack | New 20' connection @ 0950. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106142

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**Project Name:** KAFB BFF SWMU ST-106 and SS-111
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Date Started: 4/15/2011
Date TD Reached: 4/17/2011
Date Completed: 4/21/2011

Ground Elevation AMSL (ft): 5349.2
Y Coordinate: 1474945.94
X Coordinate: 1542455.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); moist; 100% fine sand; subrounded to rounded; trace gravel to 0.125in; angular to subrounded; no odor. | SP | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 245 | | | | | Well graded SAND with Gravel (SW); yellowish brown (10YR 5/4); wet; 60% fine to coarse sand; subrounded to rounded; 40% gravel to 1in; subangular to rounded; no odor. Note: gravel is granite and metamorphic. | | | |
| 250 | | | | | Same as above (245 ft); 80% sand; 20% gravel; no odor. | | Bottom of Screen | |
| 255 | | | | | Well graded SAND with Gravel (SW); brown (10YR 5/3); moist; 85% fine to coarse sand; subrounded to rounded; 15% gravel to 0.25in; subangular to rounded; no odor. Note: gravel is granite and metamorphic. | SW | | New 20' connection @ 1005. |
| 260 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); wet; 100% fine to coarse sand; subrounded to rounded; no odor. | | Bentonite Seal | |
| 265 | | | | | Same as above (260 ft); 50% fine sand; 50% medium to coarse sand; abundant pumice fragments; no odor. | | | |
| 270 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 7/21/11 16:28 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106142

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/15/2011
Date TD Reached: 4/17/2011
Date Completed: 4/21/2011

Ground Elevation AMSL (ft): 5349.2
Y Coordinate: 1474945.94
X Coordinate: 1542455.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); wet; 100% fine to coarse sand; subrounded to rounded; some pumice fragments; trace silt; no odor. | SW | | |
| 275 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; 100% fine sand; subrounded to rounded; no odor. | SP | | New 20' connection @ 1020. |
| 280 | | | | | Lean CLAY (CL); brown (7.5YR 5/3); moist; soft; high plasticity; 100% clay nodules; no odor. | CL | | |
| 285 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); wet; 100% fine sand; subrounded to rounded; no odor. | SP | Bentonite Seal | Leak at bottom of hammer box @ 1030. Hole repaired and resumed drilling @ 1040. |
| 290 | | | | | Well graded GRAVEL with Sand (GW); dark yellowish brown (10YR 4/4); wet; 70% gravel to 1.5in; subangular to rounded; 30% fine to coarse sand; subrounded to rounded; trace silt and clay; no odor. Note: gravel is granite and metamorphic. | GW | | |
| 295 | | | | | Well graded SAND with Gravel (SW); yellowish brown (10YR 5/4); moist; 80% fine to coarse sand; subrounded to rounded; 20% gravel to 0.75in; angular to subrounded; no odor. Note: gravel is granite and metamorphic. | SW | | New 20' connection @ 1100. |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106142

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/15/2011
Date TD Reached: 4/17/2011
Date Completed: 4/21/2011

Ground Elevation AMSL (ft): 5349.2
Y Coordinate: 1474945.94
X Coordinate: 1542455.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | | | | |
| 305 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; 100% fine to coarse sand; subrounded to rounded; no odor. | SW | | |
| 310 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/6); wet; 100% medium to coarse sand; subangular to rounded; no odor. | SP | Native Backfill | |
| 315 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); moist; 70% fine to coarse sand; subangular to rounded; 30% gravel to 1in; subangular to subrounded; no odor. Note: gravel is granite and metamorphic. | SW | Bentonite Seal | |
| 320 | | | | | Well graded GRAVEL with Sand (GW); dark yellowish brown (10YR 4/6); wet; 60% gravel to 1in; angular to subrounded; 40% fine to coarse sand; subrounded to rounded; no odor. Note: gravel is metamorphic. | GW | | New 20' connection @ 1115. |
| 325 | | | | | Clayey GRAVEL with Sand (GC); brown (10YR 5/3); wet; 55% gravel to 1in; subangular to rounded; 25% fine to coarse sand; subrounded to rounded; 20% clay; soft; low plasticity; no odor. | GC | Native Backfill | |
| 330 | | | | | Well graded GRAVEL (GW); various colors; wet; 90% gravel to 1in; subangular to rounded; 10% coarse sand; subangular to subrounded; trace clay; no odor. Note: gravel is metamorphic. | GW | Bentonite Seal | |

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# Borehole ID: KAFB-106142

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/15/2011
Date TD Reached: 4/17/2011
Date Completed: 4/21/2011

Ground Elevation AMSL (ft): 5349.2
Y Coordinate: 1474945.94
X Coordinate: 1542455.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); wet; 70% fine to coarse sand; subrounded to rounded; 30% gravel to 0.5in; subangular to rounded; no odor. Note: gravel is granite and metamorphic. | SW | Bentonite Seal | |
| 335 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); wet; 75% medium sand; 25% coarse sand; subangular to subrounded; no odor. | SP | Top of Filter Pack | New 20' connection @ 1135. |
| 340 | | | | | Well graded SAND (SW); brown (10YR 4/3); wet; 100% fine to coarse sand; subangular to rounded; sweet odor. | SW | Top of 3/4" Schedule 80 PVC 0.050 Slot Screen | |
| 345 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); wet; 90% fine sand; subrounded to rounded; 10% coarse sand to fine gravel; sweet odor. | SP | | |
| 350 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); wet; 100% fine to coarse sand; subangular to rounded; sweet odor. | SW | Bottom of Screen<br>Native Backfill | |
| 355 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); wet; 100% fine sand; trace medium to coarse sand; subrounded to rounded; sweet odor. | SP | Bentonite Seal | New 20' connection @ 1200. Resumed drilling @ 1300. |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106142

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/15/2011
Date TD Reached: 4/17/2011
Date Completed: 4/21/2011

Ground Elevation AMSL (ft): 5349.2
Y Coordinate: 1474945.94
X Coordinate: 1542455.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded GRAVEL with Sand (GW); brown (10YR 4/3); wet; 60% gravel to 0.75in; angular to subrounded; 40% fine to coarse sand; subangular to subrounded; sweet odor. Note: gravel is granite and metamorphic. | GW | | |
| 365 | | | | | Poorly graded SAND with Gravel (SP); brown (10YR 4/3); wet; 60% coarse sand; trace fine to medium sand; subangular to rounded; 40% gravel to 1in; subangular to rounded; no odor. Note: gravel is granite and metamorphic. | SP | Native Backfill | |
| 370 | | | | | Well graded GRAVEL with Sand (GW); various colors; wet; 80% gravel to 0.75in; angular to subrounded; 20% fine to coarse sand; subangular to rounded; no odor. Note: gravel is granite and metamorphic. | GW | | |
| 375 | | | | | Well graded GRAVEL with Sand (GW); dark yellowish brown (10YR 3/4); wet; 65% gravel to 0.5in; angular to subrounded; 35% fine to coarse sand; subangular to rounded; no odor. Note: gravel is granite and metamorphic. | GW | Bentonite Seal | New 20' connection @ 1335. |
| 380 | | | | | Poorly graded SAND with Gravel (SP); brown (10YR 4/3); wet; 85% medium sand; trace fine sand; subrounded to rounded; 15% gravel to 1in; subangular to subrounded; sweet odor. Note: gravel is granite and metamorphic. | SP | Native Backfill | |
| 385 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); wet; 100% fine to coarse sand; subangular to rounded; trace gravel to 0.75in; no odor. | SW | Bentonite Seal | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106142

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/15/2011
Date TD Reached: 4/17/2011
Date Completed: 4/21/2011

Ground Elevation AMSL (ft): 5349.2
Y Coordinate: 1474945.94
X Coordinate: 1542455.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); wet; 100% fine to coarse sand; subangular to rounded; faint sweet odor. | SW | Bentonite Seal | |
| 395 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); wet; 90% fine sand; trace coarse sand; subrounded to rounded; 10% gravel to 0.75in; faint sweet odor. | SP | | New 20' connection @ 1400. |
| 400 | | | | | Well graded SAND (SW); dark brown (10YR 3/3); dry; 100% fine to coarse sand; subrounded to rounded; no odor. | SW | Native Backfill | |
| 405 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); moist; 100% fine sand; faint sweet odor. | SP | | |
| 410 | | | | | Same as above (405 ft); sweet odor. | | Bentonite Seal | |
| 415 | | | | | Same as above (405 ft); wet; faint sweet odor. | | Native Backfill | New 20' connection @ 1430. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106142

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/15/2011
Date TD Reached: 4/17/2011
Date Completed: 4/21/2011

Ground Elevation AMSL (ft): 5349.2
Y Coordinate: 1474945.94
X Coordinate: 1542455.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); wet; 100% fine to coarse sand; subangular to rounded; faint sweet odor. | SW | Native Backfill | |
| 425 | | | | | Same as above (420 ft); sweet odor. | | | |
| 430 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); wet; 85% fine to coarse sand; subrounded to rounded; 15% gravel to 1in; subangular to rounded; faint sweet odor. Note: gravel is metamorphic. | | Bentonite Seal | |
| 435 | | | | | Clayey GRAVEL (GC); brown (7.5YR 4/3); wet; 55% gravel to 1in; angular to subrounded; 10% medium to coarse sand; subangular to subrounded; 35% clay; soft to stiff; medium to high plasticity; faint sweet odor. | GC | Top of Filter Pack | New 20' connection @ 1510. |
| 440 | | | | | Well graded SAND with Gravel (SW); various colors; wet; 55% fine to coarse sand; subangular to rounded; 45% gravel to 0.75in; subangular to subrounded; no odor. Note: gravel is granite and metamorphic. | SW | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 445 | | | | | Poorly graded SAND with Gravel (SP); various colors; wet; 50% medium to coarse sand; subrounded to rounded; 50% gravel to 0.25in; angular to subrounded; no odor. Note: gravel is metamorphic. | SP | | |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106142

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 4/15/2011
Date TD Reached: 4/17/2011
Date Completed: 4/21/2011

Ground Elevation AMSL (ft): 5349.2
Y Coordinate: 1474945.94
X Coordinate: 1542455.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Langley



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | |
| 455 | | | | | Poorly graded SAND with Clay (SP-SC); yellowish brown (10YR 5/4); wet; 90% fine sand; trace medium to coarse sand; subrounded to rounded; 10% clay nodules; soft; medium plasticity; faint sweet odor. | SP-SC | Bottom of Screen | |
| 460 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); wet; 100% fine sand; trace medium to coarse sand; subrounded to rounded; sweet odor. | SP | Native Backfill | |
| 465 | | | | | | | | Total depth = 460 ft. Reached @ 1530 on 4/17/11. Water added during drilling (gallons) = 0 |
| 470 | | | | | | | | Water added after drilling (gallons) = 0 |
| 475 | | | | | | | | Water added during construction (gallons) = Not recorded. |
| 480 | | | | | | | | |

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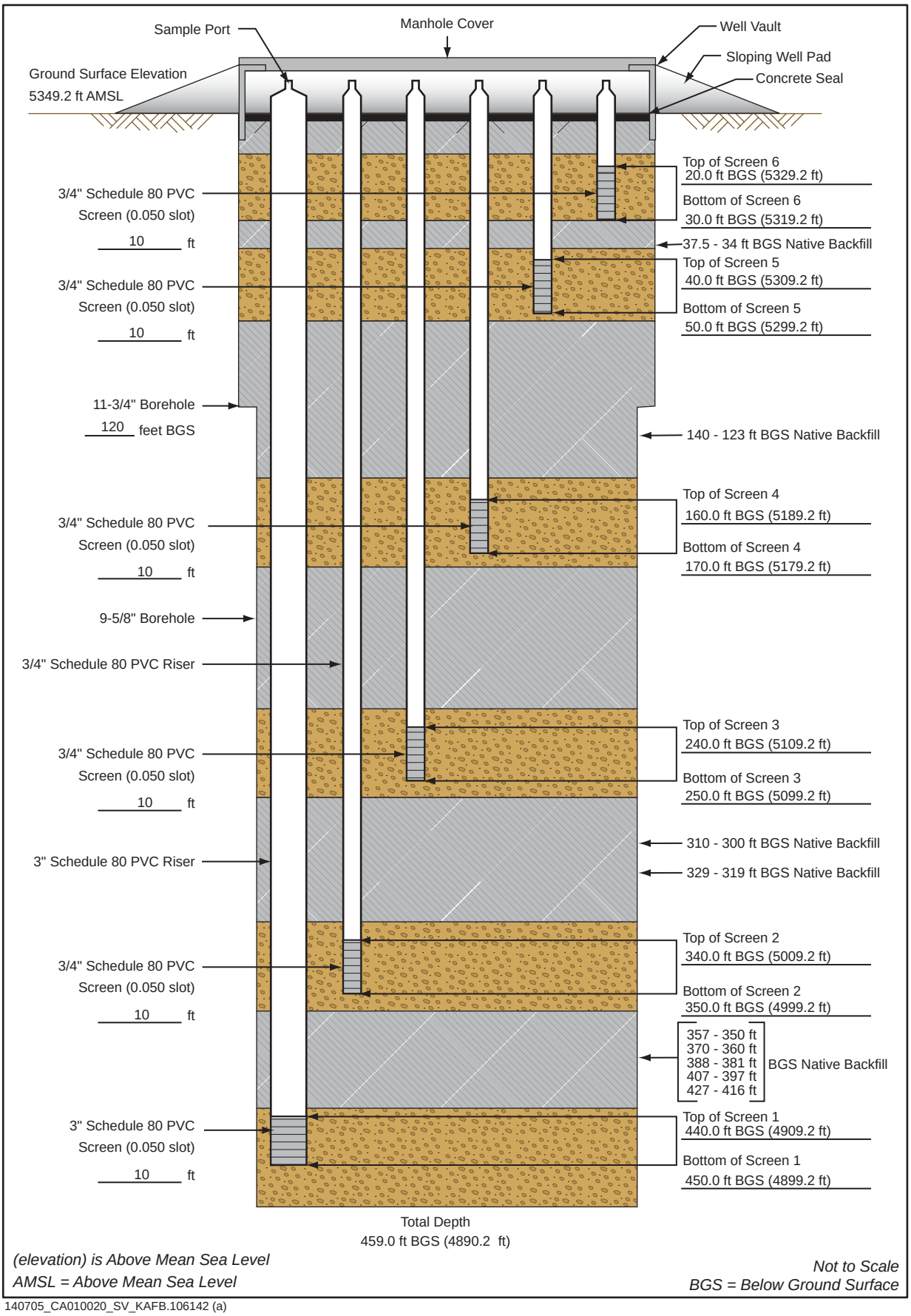
# Nested Soil Vapor Well Completion Diagram for KAFB-106142

Installation Start Date/Time: 4/18/2011 @ 09:20
Installation End Date/Time: 4/21/2011 @ 14:30



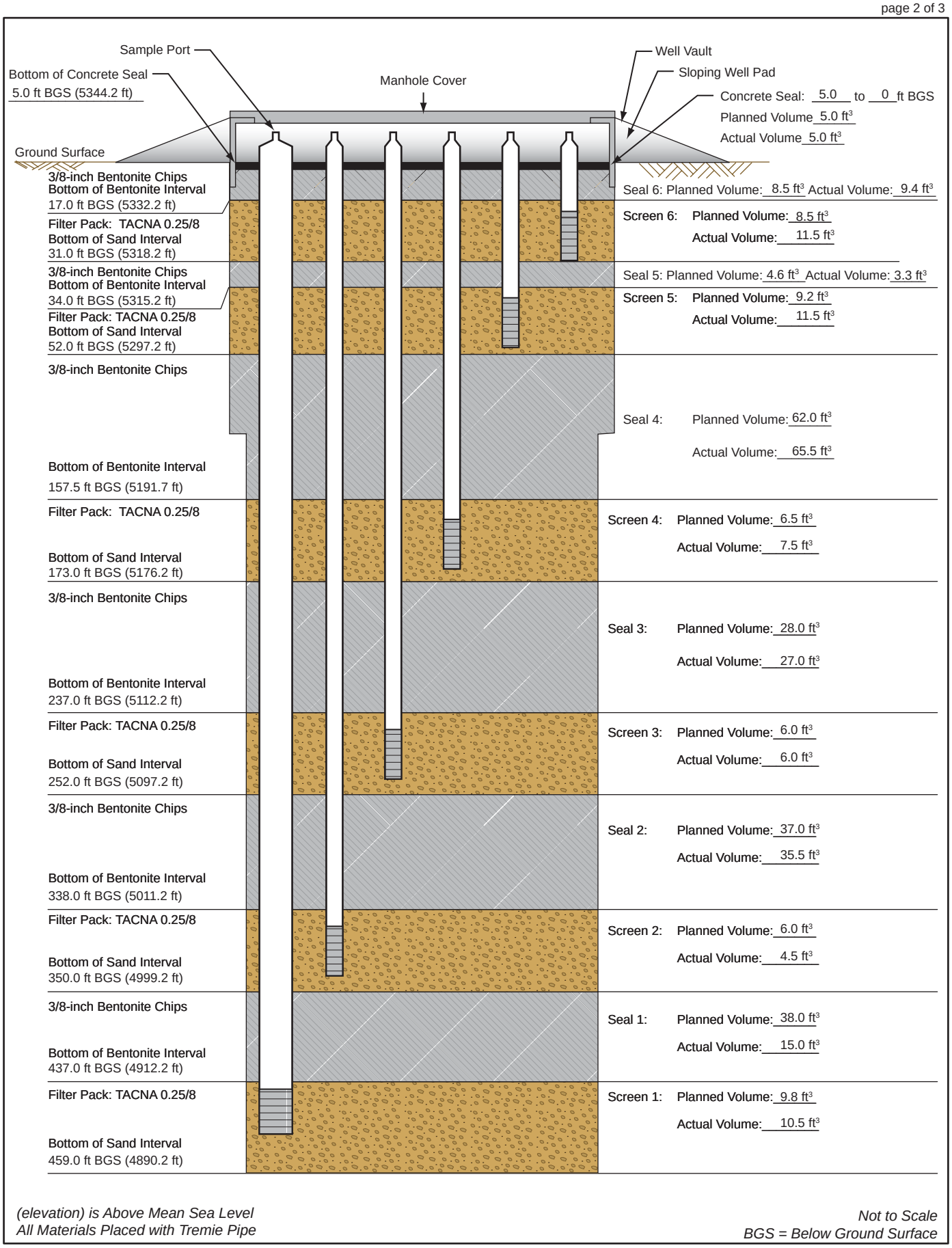



*(elevation) is Above Mean Sea Level*
*AMSL = Above Mean Sea Level*

*Not to Scale*
*BGS = Below Ground Surface*

# Nested Soil Vapor Well Completion Diagram for KAFB-106142






*(elevation) is Above Mean Sea Level*
*All Materials Placed with Tremie Pipe*

*Not to Scale*
*BGS = Below Ground Surface*

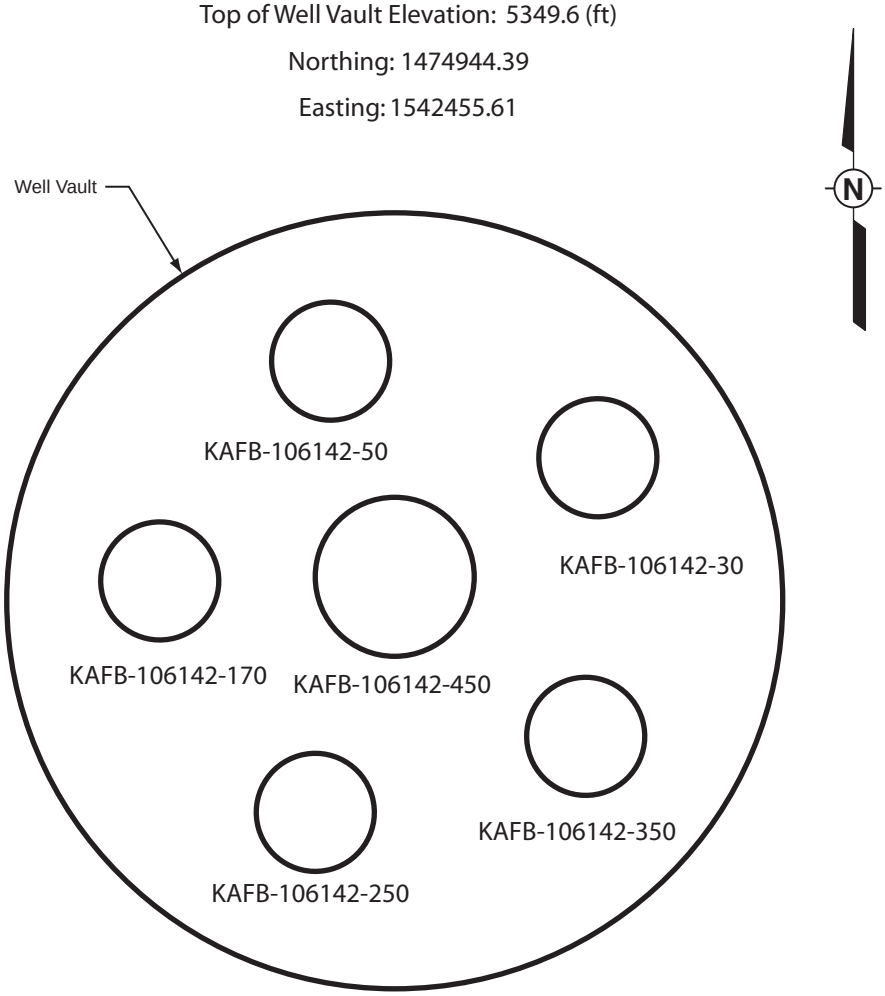
# Nested Soil Vapor Well Completion Diagram
# Map View for KAFB-106142



Top of Well Vault Elevation: 5349.6 (ft)

Northing: 1474944.39

Easting: 1542455.61




| Well Number | Well Diameter (in) | Well Depth (ft BGS) | Screened Interval (ft BGS) | Northing | Easting | Elevation (ft AMSL) |
|---|---|---|---|---|---|---|
| KAFB-106142-30 | 3/4 | 30.0 | 20.0 - 30.0 | 1474944.03 | 1542455.68 | 5349.2 |
| KAFB-106142-50 | 3/4 | 50.0 | 40.0 - 50.0 | 1474944.16 | 1542455.43 | 5349.2 |
| KAFB-106142-170 | 3/4 | 170.0 | 160.0 - 170.0 | 1474943.94 | 1542455.22 | 5349.1 |
| KAFB-106142-250 | 3/4 | 250.0 | 240.0 - 250.0 | 1474943.66 | 1542455.37 | 5349.2 |
| KAFB-106142-350 | 3/4 | 350.0 | 340.0 - 350.0 | 1474943.75 | 1542455.67 | 5349.2 |
| KAFB-106142-450 | 3 | 450.0 | 440.0 - 450.0 | 1474944.00 | 1542455.49 | 5349.2 |

# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | SILT with Sand (ML); yellowish red (5YR 4/6); dry; soft; low plasticity; 80% silt; 20% coarse sand; trace fine gravel to 6mm; faint odor. | | | Hand augered. |
| 5 | | | | | SILT with Sand (ML); light reddish brown (5YR 6/3); dry; soft; low plasticity; 75% silt; 25% very fine to fine sand; trace fine gravel to 6mm; faint odor. | ML | | Began drilling @ 1030 on 9/6/11. |
| 10 | | | | | Sandy SILT (ML); yellowish red (5YR 4/6); soft; moist; low plasticity; 70% silt; 30% fine to medium sand; trace coarse sand; faint odor. | | Cement Bentonite Grout | |
| 15 | | | 0.0 | | Sandy lean CLAY (CL); yellowish red (5YR 4/6); moist; soft; medium plasticity; 70% clay; 25% fine sand; 5% gravel; no odor. | CL | | New connection @ 1050. Resumed drilling @ 1052. |
| 20 | | | | | SILT with Sand (ML); yellowish red (5YR 5/6); moist; soft; low plasticity; 75% silt; 25% very fine to fine sand; trace gravel to 1cm; no odor. | | Bentonite Seal<br>Top of Filter Pack | |
| 25 | | | | | Same as above (20 ft); no gravel. | ML | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 30 | | | 0.4 | | | | | |

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# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | | | | |
| | | | 0.1 | | SILT with Sand (ML); yellowish red (5YR 5/6); moist; soft; low plasticity; 75% silt; 25% very fine to fine sand; trace gravel to 1cm; faint odor. | ML | | |
| 35 | | | | | Sandy lean CLAY (CL); yellowish red (5YR 5/6); moist; soft; medium plasticity; 70% clay; 30% very fine to medium sand; trace gravel to 1cm; faint odor. | CL | | |
| 40 | | | | | SILT with Sand (ML); light reddish brown (5YR 6/3); moist; soft; low plasticity; 75% silt; 25% very fine to fine sand; trace very coarse sand; faint odor. | ML | | New 20' connection @ 1115. Resumed drilling @ 1120. |
| 45 | | | | | SILT (ML); yellowish red (5YR 4/6); moist; soft; low plasticity; 90% silt; 10% very fine sand; faint odor. | | Filter Pack | |
| 50 | | | | | Same as above (45 ft). | | | |
| 55 | | | 0.1 | | SILT with Sand (ML); yellowish red (5YR 4/6); moist; soft; low plasticity; 75% silt; 25% very fine sand; faint odor. | | | |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Sandy SILT with Gravel (ML); yellowish red (5YR 4/6); moist; soft; 70% silt; trace clay nodules; 15% very fine to fine sand; 15% gravel to 1cm; subangular; faint odor. | | | New 20' connection @ 1138. Resumed drilling @ 1140. |
| 65 | | | | | SILT with Sand (ML); yellowish red (5YR 4/6); moist; soft; 85% silt; 15% very fine sand; trace gravel to 15mm; faint odor. | | | |
| 70 | | | | | Same as above (65 ft). | | | |
| 75 | | | 0.2 | | Same as above (65 ft). | ML | Filter Pack | |
| 80 | | | | | Same as above (65 ft); trace coarse sand; no gravel. | | | New 20' connection @ 1155. Resumed drilling @ 1246. |
| 85 | | | | | Same as above (65 ft). | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT with Sand (ML); yellowish red (5YR 4/6); moist; soft; low plasticity; 85% silt; 15% fine sand; trace gravel to 25mm; subangular; faint odor. | ML | | |
| 95 | | | 5.3 | | | | | |
| 100 | | | | | Poorly graded SAND with Silt (SP-SM); reddish brown (5YR 5/4); moist; loose; 90% very fine to medium sand; 10% silt; faint odor. | SP-SM | | |
| 105 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; loose; 95% fine to medium sand; 5% fine gravel to 6mm; subangular; faint odor. | SP | Filter Pack | New 20' connection @ 1308. Resumed drilling @ 1309. |
| 110 | | | | | SILT (ML); yellowish red (5YR 4/6); moist; soft; low plasticity; 90% silt; 10% very fine sand; trace coarse sand; faint odor. | | | |
| 115 | | | 10.4 | | Same as above (105 ft); 80% silt; 10% clay; 10% very fine sand. | ML | | |
| 120 | | | | | Same as above (105 ft). | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:37 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Lean CLAY (CL); yellowish red (5YR 4/6); moist; firm; medium plasticity; 90% clay; 10% very fine sand; trace gravel to 10mm; faint odor. | CL | | New 20' connection @ 1326. Resumed drilling @ 1328. |
| 125 | | | | | Same as above (120 ft); reddish brown (5YR 5/4); trace caliche. | | | |
| 130 | | | | | Poorly graded SAND with Silt (SP-SM); yellowish red (5YR 4/6); dry; loose; 90% medium to coarse sand; 10% silt; product odor. | SP-SM | Filter Pack | Cutting recovery was less than usual. |
| 135 | | | 45.8 | | Same as above (130 ft); trace gravel to 10mm; subangular. | | | |
| 140 | | | | | Well graded SAND with Clay (SW-SC); reddish brown (5YR 4/4); dry; loose; 85% fine to very coarse sand; 5% gravel to 10mm; subrounded; 10% clay; product odor. | SW-SC | | New 20' connection @ 1355. Resumed drilling @ 1358. Cyclone clogged. Cleared and resumed drilling @ 1433. |
| 145 | | | | | Poorly graded SAND (SP); yellowish red (5YR 4/6); dry; loose; 95% fine to medium sand; 5% clay; product odor. | SP | | |
| 150 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:37 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Poorly graded SAND (SP); yellowish red (5YR 4/6); dry; loose; 95% medium to coarse sand; 5% gravel to 6mm; product odor. | | | |
| 155 | | | 205.0 | | Same as above (150 ft). | SP | | |
| 160 | | | | | Well graded SAND with Gravel (SW); reddish brown (5YR 4/4); dry; loose; 85% fine to very coarse sand; 15% fine gravel to 8mm; subangular; product odor. | SW | | New 20' connection @ 1455. Resumed drilling @ 1456. |
| 165 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 3/6); dry; loose; 95% fine to medium sand; 5% very coarse sand; subangular to subrounded; product odor. | | Filter Pack | |
| 170 | | | | | Poorly graded SAND with Gravel (SP); brown (10YR 4/3); dry; loose; 80% fine to medium sand; 20% gravel to 20mm; subangular to subrounded; trace clay; product odor. | SP | | |
| 175 | | | 379.0 | | Poorly graded SAND (SP); brown (10YR 4/3); dry; loose; 90% fine to medium sand; 10% very coarse sand; product odor. | | | |
| 180 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:37 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; loose; 95% fine to medium sand; 5% clay; faint odor. | | | New 20' connection @ 1520. Resumed drilling @ 1522. Driller added water to cyclone. |
| 185 | | | | | Same as above (180 ft); brown (10YR 5/3); 100% fine to medium sand. | | Filter Pack | |
| 190 | | | | | Same as above (180 ft); trace very coarse sand. | SP | | |
| 195 | | | | | Same as above (180 ft); 90% fine to medium sand; 5% very coarse sand; 5% clay. | | Bottom of Screen<br>Bentonite Seal | |
| 200 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; loose; 95% very coarse sand; 5% clay; faint odor. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | New 5' connection and resumed drilling @ 1552. End of 9/6/11. |
| 205 | | | | | No cuttings returned. | | | Resumed drilling @ 0800 on 9/7/11. Total depth with 11-3/4" casing. Resumed drilling with 9-5/8" casing. |
| 210 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:37 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/6); wet; loose; 75% fine to very coarse sand; 20% gravel to 25mm; subrounded; 5% silt; faint odor. | | | Driller added water to cyclone. |
| 215 | | | | | Same as above (210 ft). | | | Driller added water to cyclone. |
| 220 | | | 13.5 | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); wet; loose; 100% very fine to very coarse sand; subrounded; faint odor. | | | Driller added water to cyclone. |
| 225 | | | | | Same as above (220 ft). | SW | Filter Pack | Driller added water to cyclone. New 20' connection @ 0953. Resumed drilling @ 0953. |
| 230 | | | | | Same as above (220 ft); brown (10YR 5/3); coarse to very coarse sand. Note: sand is composed of pumice. | | | Driller added water to cyclone. |
| 235 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); wet; loose; 85% fine to very coarse sand; 15% gravel to 10mm; subangular; product odor. | | | Driller added water to cyclone. |
| 240 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:37 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | 89.4 | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; loose; 100% medium to coarse sand; product odor. | SP | | Driller added water to cyclone. |
| 245 | | | | | Poorly graded SAND with Gravel (SP); dark yellowish brown (10YR 4/4); moist; loose; 60% medium to coarse sand; 40% gravel to 30mm; subangular to subrounded; faint odor. | | | Driller added water to cyclone. New 20' connection @ 1014. Resumed drilling @ 1017. |
| 250 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); moist; loose; 60% fine to very coarse sand; 40% fine gravel to 19mm; subangular to subrounded; faint odor. | SW | | Driller added water to cyclone. |
| 255 | | | | | Clayey SAND (SC); dark yellowish brown (10YR 4/4); moist; loose; 85% fine to medium sand; trace very coarse sand; 15% clay; slight odor. | SC | Filter Pack | Driller added water to cyclone. |
| 260 | | | 224.0 | | Poorly graded SAND (SP); brown (5YR 4/3); moist; loose; 95% very fine to fine sand; trace coarse sand; 5% silt; product odor. | SP | | Driller added water to cyclone. |
| 265 | | | | | Poorly graded SAND with Silt (SP-SM); dark yellowish brown (10YR 4/4); moist; loose; 90% fine to medium sand; 10% silt. | SP-SM | | Driller added water to cyclone. New 20' connection @ 1032. Resumed drilling @ 1034. Changed hopper and roll-off. |
| 270 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:37 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/6); moist; loose; 100% fine to very coarse sand; subangular; product odor. | SW | | Driller added water to cyclone. |
| 275 | | | | | Poorly graded SAND with Gravel (SP); brown (10YR 4/3); moist; loose; 85% fine to medium sand; 15% gravel to 12mm; subrounded; product odor. | SP | | Driller added water to cyclone. |
| 280 | | | 589.0 | | Fat CLAY (CH); brown (10YR 5/3); moist; firm; high plasticity; 95% clay; 5% fine sand; product odor. | CH | | Driller added water to cyclone. |
| 285 | | | | | Poorly graded SAND with Clay (SP-SC); dark yellowish brown (10YR 4/4); moist; loose; 90% fine to medium sand; 10% clay; plastic; product odor. | SP-SC | Filter Pack | Driller added water to cyclone. New 20' connection @ 1058. Resumed drilling @ 1100. |
| 290 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); moist; loose; 60% fine to very coarse sand; 40% gravel to 15mm; subangular to subrounded; faint odor. | SW | | Driller added water to cyclone. |
| 295 | | | | | Same as above (290 ft); wet. | | | Driller added water to cyclone. |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:37 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | | | | |
| | | | 16.4 | | Poorly graded SAND (SP); brown (10YR 4/3); moist; loose; 100% coarse to very coarse sand; subangular; trace gravel to 10mm; subangular; product odor. | SP | | Driller added water to cyclone. |
| 305 | | | | | | | | |
| | | | | | Well graded GRAVEL with Sand (GW); brown (10YR 4/3); wet; loose; 60% gravel to 40mm; subrounded to rounded; 40% medium to very coarse sand; product odor. | GW | | Driller added water to cyclone. New 20' connection @ 1120. Resumed drilling @ 1122. |
| 310 | | | | | | | | |
| | | | | | Well graded GRAVEL with Sand (GW); dark yellowish brown (10YR 4/4); moist; loose; 55% gravel to 25mm; subangular to subrounded; 45% medium to very coarse sand; faint odor. | | | Driller added water to cyclone. |
| 315 | | | | | | | Filter Pack | |
| | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); wet; loose; 60% very fine to very coarse sand; 40% gravel to 25mm; subrounded to rounded; trace clay; faint odor. | SW | | Driller added water to cyclone. |
| 320 | | | | | | | | |
| | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); wet; loose; 90% medium to very coarse sand; 10% gravel to 12mm; subrounded to rounded; faint odor. | | | Driller added water to cyclone. |
| 325 | | | | | | | | |
| | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; loose; 90% fine to very coarse sand; 10% gravel to 60mm; subrounded to rounded; faint odor. | | | Driller added water to cyclone. New 20' connection @ 1140. Resumed drilling @ 1142. |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:37 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; loose; 90% fine to very coarse sand; 10% gravel to 30mm; rounded; faint odor. | SW | | Driller added water to cyclone. |
| 335 | | | | | Clayey SAND (SC); brown (10YR 5/3); moist; loose; 60% very fine to fine sand; trace gravel to 40mm; rounded; 40% clay; medium plasticity; faint odor. | SC | Filter Pack | Driller added water to cyclone. |
| 340 | | | 11.8 | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); moist; loose; 80% medium to very coarse sand; subrounded; 20% gravel to 10mm; subrounded; faint odor. | | | Driller added water to cyclone. |
| 345 | | | | | Same as above (340 ft). | | | Driller added water to cyclone. New 20' connection @ 1157. Resumed drilling @ 1255. |
| 350 | | | | | Same as above (340 ft); gravel to 15mm. | SW | Bottom of Screen<br>Bentonite Seal | Driller added water to cyclone. |
| 355 | | | | | Well graded SAND (SW); brown (10YR 4/3); moist; loose; 95% medium to very coarse sand; 5% gravel to 40mm; subrounded to rounded; faint odor. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Driller added water to cyclone. |
| 360 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:37 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | | | | |
| | | | 3.6 | | Poorly graded SAND (SP); brown (10YR 4/3); moist; loose; 95% medium to coarse sand; 5% gravel to 10mm; subrounded. | SP | | Driller added water to cyclone. |
| 365 | | | | | | | | |
| | | | | | Well graded SAND with Clay and Gravel (SW-SC); dark yellowish brown (10YR 4/4); moist; loose; 75% fine to very coarse sand; 15% gravel to 8mm; subrounded; 10% clay; low plasticity; product odor. | SW-SC | | Driller added water to cyclone. New 20' connection @ 1318. Resumed drilling @ 1320. |
| 370 | | | | | | | | |
| | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); moist; loose; 85% fine to very coarse sand; 15% gravel to 20mm; subrounded; product odor. | SW | | Driller added water to cyclone. |
| 375 | | | | | | | Filter Pack | |
| | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; loose; 90% very fine to very coarse sand; subrounded; 5% gravel to 6mm; subrounded; 5% silt; faint odor. | | | Driller added water to cyclone. |
| 380 | | | | | | | | |
| | | | 4.3 | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; loose; 100% medium to coarse sand; subangular; faint odor. | SP | | Driller added water to cyclone. |
| 385 | | | | | | | | |
| | | | | | Same as above (380 ft); 95% medium to coarse sand; 5% very coarse sand; subangular; trace gravel to 6mm; subangular; faint odor. | | | Driller added water to cyclone. Changed hopper @ 1343. New 20' connection @ 1346. Resumed drilling @ 1349. |
| 390 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:37 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; loose; 95% medium to coarse sand; 5% very coarse sand; subangular; trace gravel to 6mm; subangular; faint odor. | SP | | Driller added water to cyclone. |
| 395 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 3/4); moist; loose; 80% very fine to very coarse sand; subangular; 20% gravel to 15mm; subangular to subrounded; faint odor. | SW | | Driller added water to cyclone. |
| 400 | | | 2.7 | | Same as above (395 ft). | | Filter Pack | Driller added water to cyclone. |
| 405 | | | | | Same as above (395 ft); dry; gravel to 6mm; trace clay nodules. | | | New 20' connection @ 1428. Resumed drilling @ 1430. |
| 410 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; loose; 95% very fine to very coarse sand; 5% gravel to 10mm; subangular to rounded; faint odor. | | | |
| 415 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); dry; loose; 100% fine to medium sand; trace gravel to 40mm; subangular to rounded; faint odor. | SP | | |
| 420 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:37 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | | | | |
| | | | | | Clayey SAND with Gravel (SC); brown (10YR 4/3); dry; loose; 60% fine to very coarse sand; subangular; 20% gravel to 15mm; subangular to subrounded; 20% clay nodules; faint odor. | SC | |
| 425 | | | | | | | | |
| | | | | | Poorly graded SAND with Gravel (SP); brown (10YR 4/3); dry; loose; 80% fine to medium sand; 20% gravel to 15mm; subangular to subrounded; faint odor. | SP | New 20' connection @ 1448. Resumed drilling @ 1449. |
| 430 | | | | | | | | |
| | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; loose; 60% fine to very coarse sand; subangular; 40% fine gravel to 9mm; subangular; faint odor. | SW | |
| 435 | | | | | | | | |
| | | | | | Well graded GRAVEL with Sand (GW); dark yellowish brown (10YR 4/4); dry; loose; 60% gravel to 35mm; subrounded; 40% medium to coarse sand; trace clay nodules; faint odor. | GW | Filter Pack |
| 440 | | | | | | | | |
| | | | 0.4 | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; loose; 90% fine to medium sand; 10% very coarse sand; subangular; faint odor. | SP | Driller added water to cyclone. |
| 445 | | | | | | | | |
| | | | | | Same as above (440 ft); 100% fine to medium sand; trace very coarse sand; subrounded; faint odor. | | Driller added water to cyclone. New 20' connection @ 1520. Resumed drilling @ 1521. Paused drilling @ 1525. |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; loose; 100% fine to medium sand; trace very coarse sand; subrounded; faint odor. | | | Resumed drilling @ 1605. Driller added water to cyclone. |
| 455 | | | | | Same as above (450 ft). | | | Driller added water to cyclone. |
| 460 | | | 0.5 | | Poorly graded SAND (SP); brown (10YR 4/3); moist; loose; 90% fine to medium sand; 10% very coarse sand to fine gravel to 5mm; subrounded. | SP | | Driller added water to cyclone. |
| 465 | | | | | Poorly graded SAND with Gravel (SP); brown (10YR 4/3); moist; loose; 65% fine to medium sand; subrounded; 10% very coarse sand; subangular; 25% gravel to 20mm; subrounded; faint odor. | | Filter Pack | Driller added water to cyclone and changed hopper. New 20' connection @ 1618. Resumed drilling @ 1620. |
| 470 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); moist; loose; 75% fine to very coarse sand; subangular; 20% gravel to 15mm; subangular to subrounded; 5% clay nodules; faint odor. | SW | | Driller added water to cyclone. |
| 475 | | | | | Well graded GRAVEL with Sand (GW); brown (10YR 4/3); moist; loose; 50% gravel to 20mm; subangular to subrounded; 45% medium to very coarse sand; subangular; 5% clay nodules; faint odor. | GW | | Driller added water to cyclone. |
| 480 | | | | | | | | |

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# Borehole ID: KAFB-106148

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/6/2011
Date TD Reached: 9/7/2011
Date Completed: 9/12/2011

Ground Elevation AMSL (ft): 5344.1
Y Coordinate: 1473490.11
X Coordinate: 1541498.43

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | | | | | | |
| | | | 0.4 | | Poorly graded SAND (SP); brown (10YR 4/3); moist; loose; 90% fine to medium sand; subrounded; 5% coarse sand; subrounded; 5% gravel to 40mm; subrounded; faint odor. | SP | | Driller added water to cyclone. |
| 485 | | | | | | | Bottom of Screen | |
| | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); moist; loose; 85% very fine to very coarse sand; subangular; 15% gravel to 20mm; subrounded; faint odor. | SW | | Driller added water to cyclone. New connection @ 1640. Resumed drilling @ 1641. |
| 490 | | | | | | | Bottom of Filter Pack<br>Native Backfill | |
| | | | | | Poorly graded SAND with Gravel (SP); brown (10YR 4/3); moist; loose; 80% medium to coarse sand; subangular; 5% very coarse sand; subrounded; 15% gravel to 12mm; subrounded; faint odor. | SP | | Total Depth = 490 ft. Reached @ 1700 on 9/7/11. |
| 495 | | | | | | | | Water added during drilling (gallons) = 0 |
| | | | | | | | | Water added after drilling (gallons) = 0 |
| 500 | | | | | | | | PID measurements obtained from cuttings placed in jar. |
| 505 | | | | | | | | |
| 510 | | | | | | | | |

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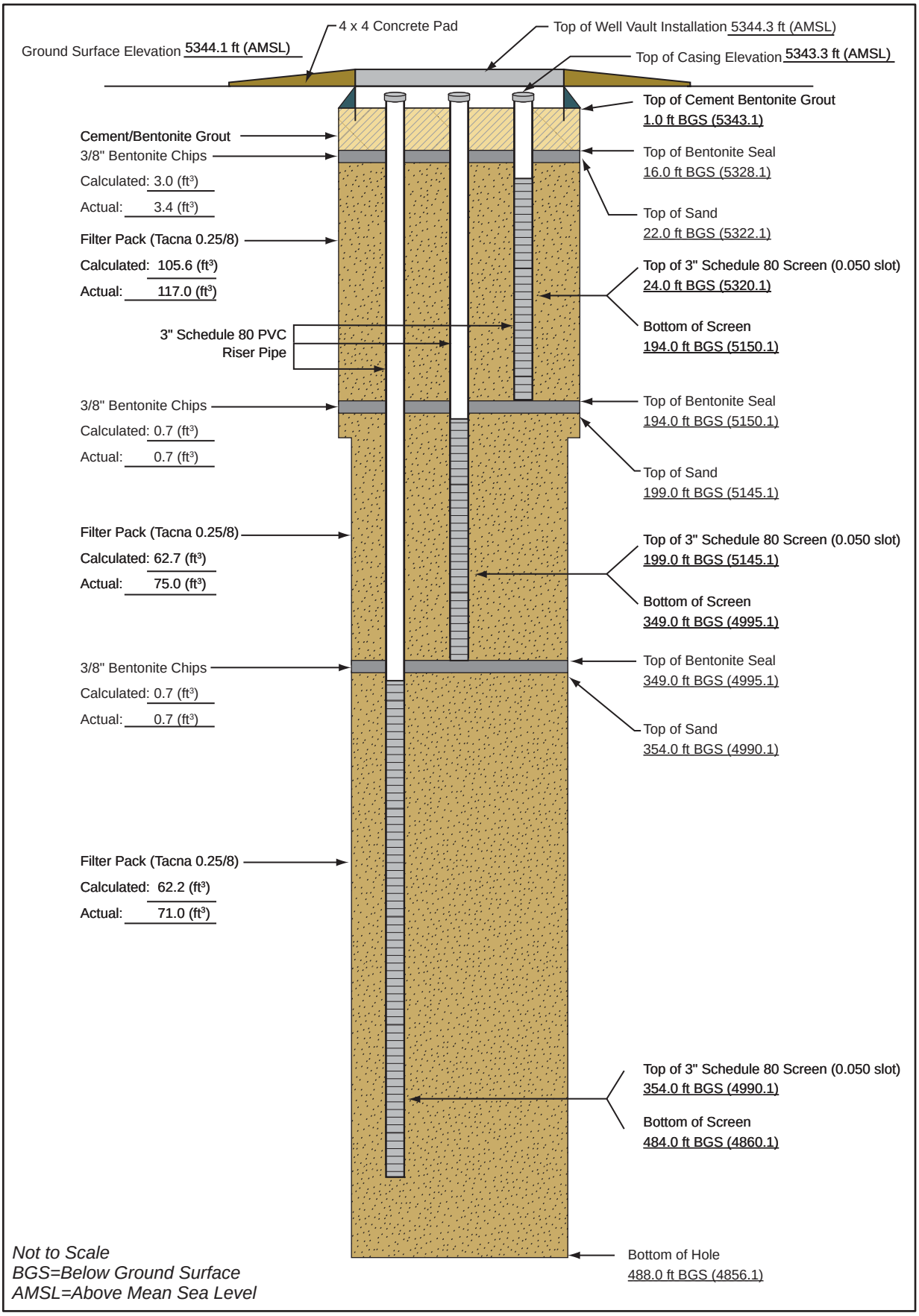
# PneuLog Well Completion Diagram KAFB-106148

Installation Start Date/Time: 9/08/2011@10:00
Installation End Date/Time: 9/12/2011@10:20




140705.EA010020_106148

# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Sandy SILT with Gravel (ML); reddish brown (5YR 5/3); dry; soft; low plasticity; 60% silt; 25% very fine to fine sand; 15% gravel to 15mm; angular to subangular; faint odor. | | | Hand augered. |
| 5 | | | | | SILT with Gravel (ML); light reddish brown (5YR 6/4); moist; soft; low plasticity; 85% silt; 15% fine gravel to 5mm; subrounded; faint odor. | | | Began drilling @ 1635 on 9/12/11. |
| 10 | | | | | SILT (ML); reddish brown (5YR 5/4); moist; soft; low plasticity; 100% silt; trace fine gravel to 5mm; subangular; faint odor. | ML | Cement Bentonite Grout | |
| 15 | | | | | SILT with Sand (ML); yellowish red (5YR 4/6); moist; soft; low plasticity; 75% silt; 20% fine sand; 5% coarse sand; trace gravel to 8mm; subrounded; faint odor. | | | |
| 20 | | | | | SILT with Sand (ML); reddish brown (5YR 5/4); moist; soft; low plasticity; 75% silt; 25% very fine to fine sand; trace gravel to 6mm; subrounded; faint odor. | | Bentonite Seal<br>Top of Filter Pack | New 20' connection @ 1706. Resumed drilling @ 1710. |
| 25 | | | | | Lean CLAY (CL); reddish brown (5YR 4/4); moist; firm; medium plasticity; 90% clay; 10% very fine sand; faint odor. | CL | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 30 | | | | | | | | |

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# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); yellowish red (5YR 4/6); moist; soft; low plasticity; 90% silt; 10% very fine sand; faint odor. | | | |
| 35 | | | | | Gravelly SILT (ML); light reddish brown (5YR 6/3); moist; soft; low plasticity; 60% silt; 30% gravel to 8mm; subrounded; 10% very fine sand; faint odor. | | | |
| 40 | | | | | SILT with Sand (ML); yellowish red (5YR 4/6); moist; soft; low plasticity; 80% silt; 15% very fine sand; 5% gravel to 5mm; subrounded; faint odor. | | | End of 9/12/11. New 20' connection @ 0910 on 9/13/11. Resumed drilling @ 0913. |
| 45 | | | | | SILT with Gravel (ML); yellowish red (5YR 4/6); moist; soft; low plasticity; 85% silt; 15% gravel to 7mm; subangular; faint odor. Note: abundant pumice. | ML | Filter Pack | |
| 50 | | | | | Sandy SILT with Gravel (ML); yellowish red (5YR 4/6); moist; soft; low plasticity; 50% silt; 25% fine sand; 25% gravel to 17mm; subrounded to subangular; faint odor. | | | |
| 55 | | | 0.0 | | SILT with Sand (ML); yellowish red (5YR 4/6); moist; soft; low plasticity; 85% silt; 10% very fine sand; 5% gravel to 5mm; subangular; faint odor. | | | Driller added water to cyclone. |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT (ML); yellowish red (5YR 4/6); moist; soft; low placticity; 90% silt; 10% very fine sand; trace very coarse sand and fine gravel to 5mm; angular; faint odor. | ML | Filter Pack | New 20' connection @ 0935. Resumed drilling @ 0936. Driller added water to the cyclone |
| 65 | | | | | Sandy SILT (ML); yellowish red (5YR 4/6); moist; soft; low plasticity; 50% silt; 45% very fine to fine sand; 5% gravel to 5mm; subrounded; faint odor. | | | Driller added water to cyclone. |
| 70 | | | | | Sandy SILT (ML); yellowish red (5YR 4/6); moist; soft; low plasticity; 60% silt; 40% very fine sand; trace gravel to 14mm; rounded; faint odor. | | | Driller added water to cyclone. |
| 75 | | | 0.0 | | SILT with Sand (ML); yellowish red (5YR 4/6); moist; soft; low plasticity; 85% silt; 15% very fine sand; trace clay nodules; faint odor. | | | Driller added water to cyclone. |
| 80 | | | | | SILT with Sand (ML); yellowish red (5YR 4/6); moist; soft; low plasticity; 80% silt; 20% very fine sand; trace gravel to 6mm; subrounded; faint odor. | | | New 20' connection @ 0955. Resumed drilling @ 0957. Driller added water to cyclone. |
| 85 | | | | | Same as above (80 ft); 75% silt; 25% very fine sand. | | | Driller added water to cyclone. |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Silty SAND (SM); yellowish red (5YR 4/6); moist; loose; 70% fine to medium sand; trace gravel to 15mm; subangular; 30% silt; trace clay nodules; faint odor. Note: gravel is composed of pumice. | SM | | Driller added water to cyclone. |
| 95 | | | 0.2 | | Poorly graded SAND with Silt (SP-SM); dark yellowish brown (10YR 4/6); moist; 90% fine to medium sand; trace gravel to 10mm; rounded; 10% silt; faint odor. Note: gravel is composed of pumice. | SP-SM | | Driller added water to cyclone. |
| 100 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; loose; 90% medium sand; 5% coarse sand; subangular; 5% silt; faint odor. | SP | | New 20' conncetion @ 1017. Resumed drilling @ 1020. Driller added water to cyclone. |
| 105 | | | | | Clayey GRAVEL with Sand (GC); brown (5YR 5/3); wet; loose; 35% gravel to 4mm; subangular; 25% very coarse sand; 40% clay; plastic; faint odor. | GC | Filter Pack | Driller added water to cyclone. |
| 110 | | | | | Same as above (105 ft). | GC | | Minimal recovery. Driller added water to cyclone. Stopped drilling @ 1030 to clear out cyclone. |
| 115 | | | 0.2 | | Sandy fat CLAY (CH); light yellowish brown (10YR 6/4); wet; firm; high plasticity; 70% clay; 30% medium to very coarse sand; faint odor. | CH | | Replaced hopper. Resumed drilling @ 1050. Driller added water to cyclone. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Sandy lean CLAY (CL); reddish brown (5YR 5/4); moist; firm; medium plasticity; 70% clay; 30% very fine sand; trace gravel to 10mm; subangular; faint odor. | CL | | New 20' connection @ 1110. Resumed drilling @ 1112. Driller added water to cyclone to loosen sediments. |
| 125 | | | | | Same as above (120 ft). | CL | | Driller added water to cyclone. |
| 130 | | | | | Same as above (120 ft). Note: Clay occurs as hard, dry nodules; caliche present. | CL | | Low recovery. |
| 135 | | | 0.0 | | Same as above (120 ft); fine to medium sand. | CL | Filter Pack | |
| 140 | | | | | Poorly graded SAND with Clay and Gravel (SP-SC); brown (10YR 4/3); moist; loose; 50% medium to coarse sand; 40% fine gravel to 7mm; subrounded; 10% clay nodules; faint odor. | SP-SC | | Replaced hopper @ 1135. New 20' connection @ 1140. Resumed drilling @ 1141. Driller added water to cyclone. |
| 145 | | | | | Poorly graded SAND with Gravel (SP); brown (10YR 4/3); moist; loose; 80% medium to coarse sand; subangular; 15% gravel to 15mm; subangular to subrounded; 5% clay nodules; faint odor. | SP | | Driller added water to cyclone. |
| 150 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:34 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | SILT (ML); yellowish red (5YR 4/6); moist; soft; low plasticity; 90% silt; 10% very fine sand. | ML | | Driller added water to cyclone. |
| 155 | | | 0.0 | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; loose; 90% fine to very coarse sand; 10% fine gravel to 5mm; subrounded; faint odor. | SW | | Driller added water to cyclone. |
| 160 | | | | | Same as above (155 ft); 100% fine to very coarse sand; subrounded; faint odor. | | | New 20' connection @ 1200. Resumed drilling @ 1235. Driller added water to cyclone. |
| 165 | | | | | Same as above (155 ft). | | Filter Pack | Driller added water to cyclone. |
| 170 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (5YR 4/4); moist; loose; 75% fine to very coarse sand; subrounded; 25% gravel to 10mm; subangular to subrounded; 5% clay nodules; faint odor. | | | Driller added water to cyclone. |
| 175 | | | 0.2 | | Well graded SAND (SW); dark yellowish brown (5YR 4/4); moist; loose; 90% fine to very coarse sand, subrounded; 10% gravel to 8mm; subangular; faint odor. | | | Driller added water to cyclone. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Well graded SAND (SW); dark yellowish brown (5YR 4/4); moist; loose; 90% fine to very coarse sand; rounded; 10% gravel to 10mm; subangular to subrounded; faint odor. | | | New 20' connection @ 1257. Resumed drilling @ 1300. Driller added water to cyclone. |
| 185 | | | | | Well graded SAND (SW); dark yellowish brown (5YR 4/4); moist; loose; 100% fine to very coarse sand; subrounded; trace gravel to 5mm; subrounded; faint odor. | | Filter Pack | Driller added water to cyclone. |
| 190 | | | | | Same as above (185 ft). | SW | | Driller added water to cyclone. |
| 195 | | | 0.6 | | Same as above (185 ft). | | Bottom of Screen<br>Bentonite Seal | Driller added water to cyclone. |
| 200 | | | | | Same as above (185 ft). | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | New 5' connection @ 1315. Resumed drilling @ 1320. Driller added water to cyclone. |
| 205 | | | | | No cuttings returned. | | | Total depth with 11-3/4" casing. Resumed drilling with 9-5/8" casing @1550. Driller added water to cyclone. |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded GRAVEL with Sand (GW); dark yellowish brown (10YR 4/4); dry; loose; 85% gravel to 50mm; subangular to rounded; 15% very coarse sand; subangular to rounded; faint odor. | GW | | |
| 215 | | | 0.4 | | Well graded SAND with Gravel (SW); brown (10YR 4/3); wet; loose; 60% fine to very coarse sand; subangular; 40% gravel to 25mm; subangular to subrounded; faint odor. | | | Driller added water to cyclone. |
| 220 | | | | | Same as above (215 ft); gravel to 30mm. | | | New 20' connection @ 1604. Resumed drilling @ 1605. Driller added water to cyclone. |
| 225 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); wet; loose; 95% fine to very coarse sand; subrounded; 5% gravel to 17mm; subrounded; faint odor. Note: fine gravel is composed of pumice. | SW | Filter Pack | Driller added water to cyclone. |
| 230 | | | | | Same as above (225 ft). | | | |
| 235 | | | 0.1 | | Same as above (225 ft). | | | |
| 240 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:34 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND with Gravel (SP); dark yellowish brown (10YR 4/4); moist; 85% fine to medium sand; subangular; 15% gravel to 15mm; trace clay nodules; faint odor | SP | | New 20' connection @ 1615. Resumed drilling @ 1617. Driller added water to cyclone. |
| 245 | | | | | Lean CLAY (CL); light yellowish brown (10YR 6/4); moist; hard; medium plasticity; 90% clay; 10% coarse to very coarse sand; faint odor | CL | | Driller added water to cyclone. |
| 250 | | | | | Sandy SILT (ML); yellowish brown (10YR 5/4); moist; soft; low plasticity; 60% silt; 40% very fine sand; faint odor. | ML | Filter Pack | Driller added water to cyclone. |
| 255 | | | 53.0 | | Same as above (250 ft); 40% fine to medium sand. | | | Driller added water to cyclone. |
| 260 | | | | | Silty SAND (SM); dark yellowish brown (10YR 4/4); moist; loose; 70% fine to medium sand; 30% silt; faint odor. | SM | | New 20' connection @ 1636. Resumed drilling @ 1637. Driller added water to cyclone. |
| 265 | | | | | Poorly graded SAND (SP); moist; loose; 85% fine to medium sand; 10% gravel to 6mm; subrounded; 5% silt; faint odor. | SP | | Driller added water to cyclone. |
| 270 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:34 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; loose; 90% fine to medium sand; 5% very coarse sand; trace gravel to 10mm; rounded; 5% silt; faint odor. | SP | | Driller added water to cyclone. |
| 275 | | | 6.3 | | Same as above (270 ft). | SP | | Driller added water to cyclone. |
| 280 | | | | | Lean CLAY with Sand (CL); light yellowish brown (10YR 6/4); wet; soft; medium plasticity; 85% clay; 15% fine to medium sand; faint odor. | CL | | New 20' connection @ 1648. Resumed drilling @ 1649. Driller added water to cyclone. |
| 285 | | | | | Sandy lean CLAY (CL); yellowish brown (10YR 5/4); moist; firm; medium plasticity; 65% clay; 35% fine to medium sand; product odor. | CL | Filter Pack | Driller added water to cyclone. |
| 290 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; loose; 95% fine to very coarse sand; subrounded; 5% gravel to 5mm; subrounded; trace clay nodules; faint odor. | SW | | Driller added water to cyclone. |
| 295 | | | 7.8 | | Well graded SAND with Clay and Gravel (SW-SC); dark yellowish brown (10YR 4/4); moist; 65% fine to very coarse sand; subrounded; 25% gravel to 8mm; subrounded; 10% clay nodules; faint odor. | SW-SC | | Driller added water to cyclone. |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:34 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Poorly graded SAND with Gravel (SP); brown (10YR 4/3); moist; loose; 80% medium sand; 20% gravel to 10mm; subangular to subrounded; faint odor. | SP | | New 20' connection @ 1701. Resumed drilling @ 1704. Driller added water to cyclone. |
| 305 | | | | | Well graded GRAVEL (GW); brown (10YR 4/3); dry; loose; 90% gravel to 30mm; subangular to subrounded; 10% fine to very coarse sand; trace silt; faint odor. | GW | | |
| 310 | | | | | Poorly graded SAND with Gravel (SP); brown (10YR 4/3); moist; loose; 70% fine to medium sand; 30% gravel to 30mm; rounded; trace clay nodules; faint odor. | SP | | Driller added water to cyclone. |
| 315 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 90% fine to very coarse sand; subrounded; 10% gravel to 5mm; rounded; faint odor. | SW | Filter Pack | |
| 320 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); moist; loose; 55% very fine to very coarse sand; subrounded; 40% gravel to 20mm; subrounded; 5% silt; no odor. | | | End of 9/13/11. New 20' connection @ 0820 on 9/14/11. Resumed drilling @ 0825. Driller added water to cyclone. |
| 325 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/6); moist; loose; 95% medium to coarse sand; 5% very coarse sand; subrounded; trace gravel to 30mm; rounded; no odor. | SP | | Driller added water to cyclone. |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/6); moist; loose; 80% fine to very coarse sand; subrounded; 15% gravel to 25mm; subrounded; 5% silt; faint odor. | SW | | Driller added water to cyclone. |
| 335 | | | 2.9 | | Well graded SAND (SW); brown (10YR 4/4); moist; loose; 95% fine to very coarse sand; trace gravel to 8mm; rounded; 5% silt; faint odor. | SW | Filter Pack | Driller added water to cyclone. |
| 340 | | | | | Clayey SAND with Gravel (SC); dark yellowish brown (10YR 4/4); moist; loose; 50% fine to medium sand; 10% very coarse sand; rounded; 20% gravel to 5mm; rounded; 20% clay nodules; faint odor. | SC | | New 20' connection @ 0843. Resumed drilling @ 0846. Driller added water to cyclone. |
| 345 | | | | | Poorly graded SAND with Gravel (SP); dark yellowish brown (10YR 4/4); moist; loose; 60% medium sand; 40% gravel to 20mm; rounded; faint odor. | SP | Bottom of Screen | Driller added water to cyclone. |
| 350 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; loose; 95% fine to very coarse sand; subrounded; 5% gravel to 20mm; subrounded; trace clay nodules; faint odor. | SW | Bentonite Seal | Driller added water to cyclone. |
| 355 | | | 7.0 | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); moist; loose; 80% fine to very coarse sand; subrounded; 20% gravel to 30mm; rounded; faint odor. | SW | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Driller added water to cyclone. |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); moist; loose; 80% fine to very coarse sand; rounded; 15% gravel to 25mm; rounded; 5% clay nodules; faint odor. | | | New 20' connection @ 0904. Resumed drilling @ 0907. Driller added water to cyclone. |
| 365 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; loose; 90% fine to very coarse sand; subangular to subrounded; 10% gravel to 10mm; subangular to subrounded; faint odor. | | | Driller added water to cyclone. |
| 370 | | | | | Same as above (365 ft). | SW | | Driller added water to cyclone. |
| 375 | | | 2.1 | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); wet; loose; 95% fine to very coarse sand; subangular to subrounded; 5% clay; faint odor. | | Filter Pack | Driller added water to cyclone. |
| 380 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; loose; 95% medium to coarse sand; subrounded; 5% very coarse sand; subrounded; trace gravel to 40mm; faint odor. | SP | | New 20' connection @ 0951. Resumed drilling @ 0952. Driller added water to cyclone. |
| 385 | | | | | Well graded SAND (SW); brown (10YR 4/3); wet; loose; 95% fine to very coarse sand; subangular; 5% gravel to 25mm; subrounded; faint odor. | SW | | Driller added water to cyclone. |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; loose; 100% fine to very coarse sand; faint odor. | | | Driller added water to cyclone. |
| 395 | | | 13.3 | | Well graded SAND (SW); dark yellowish brown (10YR 4/6); wet; loose; 90% fine to very coarse sand; 10% fine gravel to 5mm; subrounded. | | | Driller added water to cyclone. |
| 400 | | | | | Same as above (395 ft). | | | New 20' connection @ 1106. Resumed drilling @ 1110. Driller added water to cyclone. |
| 405 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); moist; loose; 85% very fine to very coarse sand; subangular to subrounded; 15% gravel to 7mm; subangular; faint odor. | SW | Filter Pack | Driller added water to cyclone. |
| 410 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; loose; 95% very fine to very coarse sand; subangular; trace gravel to 5mm; subangular; 5% silt; faint odor. | | | Driller added water to cyclone. |
| 415 | | | 6.0 | | Same as above (410 ft). | | | Driller added water to cyclone. |
| 420 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:34 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); moist; loose; 80% fine to very coarse sand; subrounded; 15% gravel to 20mm; subrounded; 5% silt; faint odor. | | | New 20' connection @ 1126. Resumed drilling @ 1127. Driller added water to cyclone. |
| 425 | | | | | Same as above (420 ft); trace clay nodules. | SW | | Driller added water to cyclone. |
| 430 | | | | | Silty SAND (SM); dark yellowish brown (10YR 4/4); moist; loose; 70% fine to medium sand; trace gravel to 6mm; subrounded; 30% silt; faint odor. | SM | | Driller added water to cyclone. |
| 435 | | | 13.3 | | Well graded SAND (SW); brown (10YR 4/3); moist; loose; 85% very fine to very coarse sand; subangular; 10% gravel to 18mm; subangular; 5% silt; faint odor. | SW | Filter Pack | Driller added water to cyclone. |
| 440 | | | | | Poorly graded SAND with Silt (SP-SM); yellowish brown (10YR 5/4); moist; loose; 90% fine to medium sand; trace gravel to 5mm; subangular; 10% silt; product odor. | | | New 20' connection @ 1146. Resumed drilling @ 1147. Driller added water to cyclone. |
| 445 | | | | | Same as above (440 ft). | SP-SM | | |
| 450 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:34 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Poorly graded SAND with Silt (SP-SM); yellowish brown (10YR 5/4); moist; loose; 90% fine to medium sand; 10% silt; product odor. | SP-SM | | Driller added water to cyclone. |
| 455 | | | 9.0 | | Silty SAND (SM); dark yellowish brown (10YR 4/4); moist; loose; 80% fine to medium sand; 20% silt; product odor. | SM | | Driller added water to cyclone. |
| 460 | | | | | SILT (ML); dark yellowish brown (10YR 6/4); moist; soft; nonplastic; 100% silt; trace gravel to 35mm; subrounded; product odor. | ML | | New 20' connection @ 1204. Resumed drilling @ 1250. Driller added water to cyclone. |
| 465 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); moist; loose; 70% very fine to very coarse sand; subangular; 25% gravel to 10mm; subangular; 5% silt; product odor. | SW | Filter Pack | Driller added water to cyclone. |
| 470 | | | | | Same as above (465 ft). | | | |
| 475 | | | 82.0 | | Same as above (465 ft); gravel to 15mm. | | | |
| 480 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:34 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106149

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/12/2011
Date TD Reached: 9/14/2011
Date Completed: 9/16/2011

Ground Elevation AMSL (ft): 5346.1
Y Coordinate: 1473378.95
X Coordinate: 1541755.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Virginia Bracht

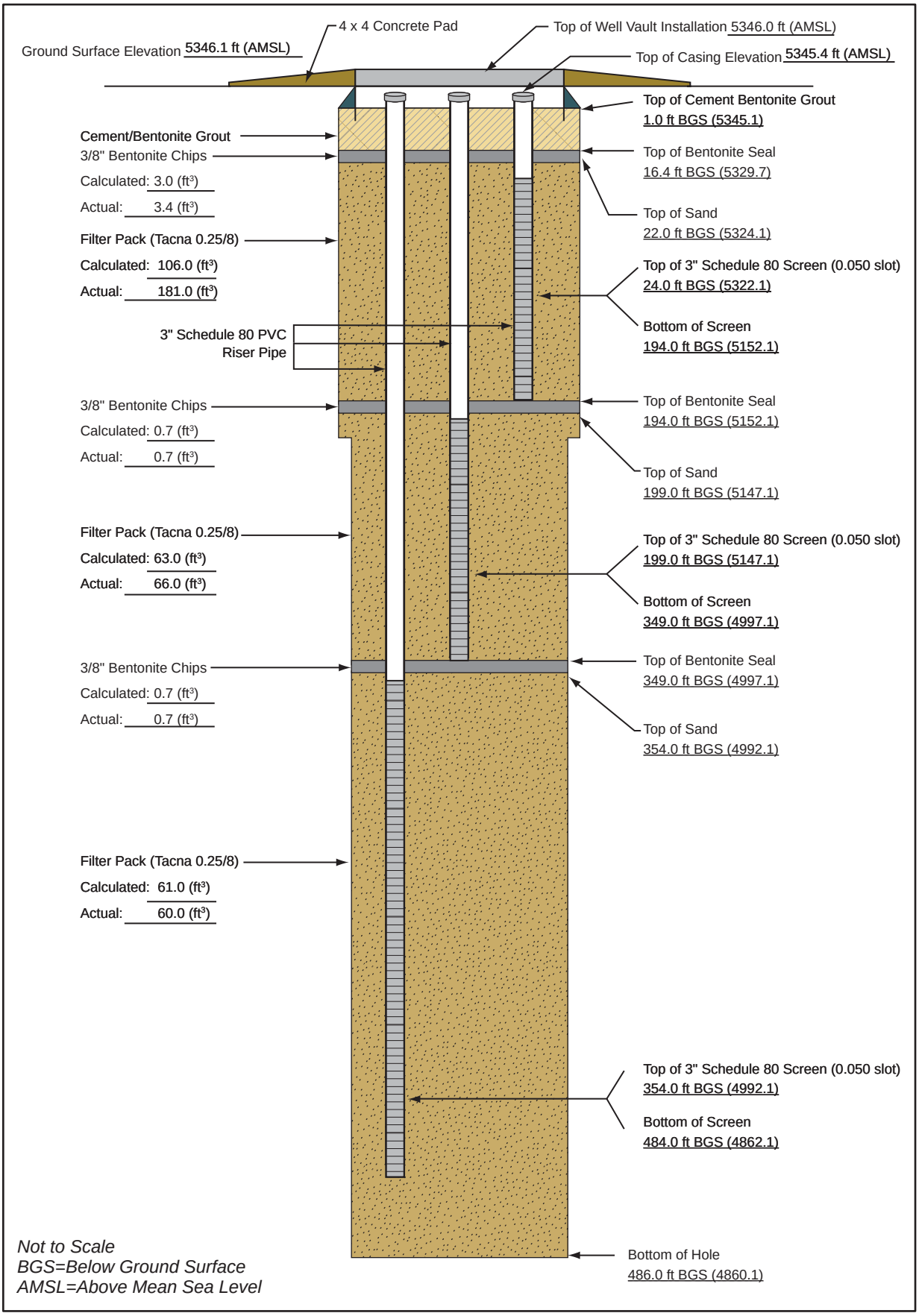


| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | | | Clayey SAND (SC); dark yellowish brown (10YR 4/4); moist; loose; 80% very fine to medium sand; trace gravel to 25mm; rounded; 20% clay; strong product odor. | SC | Bottom of Screen | New 10' connection @ 1310. Resumed drilling @ 1312. Driller added water to cyclone. |
| 485 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); moist; loose; 90% fine to medium sand; 5% very coarse sand; subangular; trace gravel to 20mm; subangular; 5% silt; strong product odor. | SP | Bottom of Filter Pack<br>Native Backfill | Driller added water to cyclone. |
| 490 | | | 176.0 | | Well graded SAND with Gravel (SW); brown (10YR 4/3); moist; loose; 80% very fine to very coarse sand; subrounded; 20% gravel to 15mm; subrounded; strong product odor. | SW | | Total Depth = 490 ft. Reached @ 1320 on 9/14/11.<br>Water added during drilling (gallons) = 0<br>Water added after drilling (gallons) = 0<br>PID measurements obtained from cuttings placed in a jar. |
| 495 | | | | | | | | |
| 500 | | | | | | | | |
| 505 | | | | | | | | |
| 510 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 14:34 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# PneuLog Well Completion Diagram KAFB-106149

Installation Start Date/Time: 9/15/2011@08:40
Installation End Date/Time: 9/16/2011@13:15




140705.EA010020_106149

# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | SILT (ML); brown (7.5YR 5/3); damp; soft; nonplastic; 95% silt; 5% fine sand; slight odor. | | | Hand augered. |
| 5 | | | | | Same as above (0 ft); reddish brown (5YR 5/3). | | | Began drilling @ 1520 on 9/19/11. |
| 10 | | | | | Same as above (0 ft); reddish brown (5YR 4/3); trace coarse sand; no odor. | | Cement Bentonite Grout | |
| 15 | | | | | Same as above (0 ft); reddish brown (5YR 4/4); 5% fine to coarse sand; no odor. | ML | | Kelly down @ 1535. New 20' connection and resumed drilling @ 1542. |
| 20 | | | 0.0 | | Same as above (0 ft); non to low plasticity. | | Top of Filter Pack Bentonite Seal | |
| 25 | | | | | Same as above (0 ft); trace clay nodules; trace gravel. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/10/11 11:21 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); reddish brown (5YR 4/4); damp; soft; low plasticity; 100% silt; trace gravel; no odor. | | | |
| 35 | | | | | Same as above (30 ft); light reddish brown (5YR 6/4); dry; nonplastic; no odor. | ML | | Kelly down @ 1553. New 20' connection and resumed drilling @ 1602. |
| 40 | | | 0.0 | | Lean CLAY (CL); reddish brown (5YR 5/4); damp; stiff; medium plasticity; 100% clay; no odor. | | | |
| 45 | | | | | Same as above (40 ft); brown (7.5YR 4/3); damp to moist; 95% silt; 5% fine to coarse sand. | CL | Filter Pack | |
| 50 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 90% fine to coarse sand; angular; 10% fine gravel to 1cm; subrounded; no odor. Note: gravel is composed of granite. | | | |
| 55 | | | | | Same as above (50 ft); 100% fine to coarse sand; angular. | SW | | Kelly down @ 1614. New 20' connection and resumed drilling @ 1620. |
| 60 | | | | | | | | |

# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 100% fine to coarse sand; angular; no odor. | SW | | |
| 65 | | | | | Same as above (60 ft). | | | |
| 70 | | | | | Lean CLAY (CL); reddish brown (5YR 4/3); damp; firm; medium plasticity; 100% clay; no odor. | CL | | |
| 75 | | | | | SILT (ML); brown (7.5YR 5/3); damp; soft to firm; nonplastic; 100% silt; no odor. | | Filter Pack | Kelly down @ 1628. New 20' connection and resumed drilling @ 1635. |
| 80 | | | 0.0 | | SILT with Sand (ML); brown (10YR 4/3); damp; firm; non to low plasticity; 85% silt; 15% fine to coarse sand; angular; no odor. | ML | | |
| 85 | | | | | Elastic SILT (MH); brown (7.5YR 5/4); damp; firm; low to medium plasticity; 100% silt; trace coarse sand; no odor. | MH | | |
| 90 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/10/11 11:21 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); damp; dense; 95% fine to medium sand; 5% silt and clay; no odor. | SP | | |
| 95 | | | | | Same as above (90 ft); trace coarse sand. | | | Kelly down @ 1647. New 20' connection and resumed drilling @ 1653. |
| 100 | | | 0.0 | | Sandy elastic SILT (MH); brown (7.5YR 5/3); damp; firm; low to medium plasticity; 60% silt; 40% fine to coarse sand; angular; no odor. | MH | | |
| 105 | | | | | Silty SAND (SM); brown (10YR 4/3); damp; dense; 60% fine to coarse sand; angular; trace gravel; 40% silt; no odor. | SM | Filter Pack | |
| 110 | | | | | Silt (ML); brown (7.5YR 5/3); damp; firm; nonplastic; 100% silt; no odor. | ML | | |
| 115 | | | | | Same as above (110 ft); brown (7.5YR 4/3); no odor. | | | Kelly down @ 1702. New 20' connection @ 1710. End of 9/19/11. Resumed drilling @ 0817 on 9/20/11. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | 0.0 | | SILT (ML); brown (7.5YR 5/3); damp; firm; nonplastic; 100% silt; no odor. | ML | | |
| 125 | | | | | No cuttings returned. | | | |
| 130 | | | | | Elastic SILT (MH); brown (7.5YR 4/4); damp; firm; low to medium plasticity; 100% silt; no odor. | MH | | |
| 135 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 100% fine to coarse sand; subrounded; trace tuff grains; no odor. | SW | Filter Pack | Approximate top of Santa Fe Group. Kelly down @ 0840. New 20' connection and resumed drilling @ 0846. |
| 140 | | | 0.2 | | Same as above (135 ft). | | | |
| 145 | | | | | Silt with SAND (ML); brown (7.5YR 5/4); damp; firm; nonplastic; 85% silt; 15% fine sand; no odor. | ML | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Well graded SAND (SW); brown (10YR 5/3); damp; dense; 95% fine to coarse sand; rounded; 5% silt and clay; trace tuff grains; trace fine gravel; no odor. | | | |
| 155 | | | | | Same as above (150 ft). | | | Kelly down @ 0900. New 20' connection and resumed drilling @ 0906. |
| 160 | | | 0.0 | | Same as above (150 ft). | | | |
| 165 | | | | | Same as above (150 ft); 100% fine to coarse sand; no odor. | SW | Filter Pack | |
| 170 | | | | | Same as above (150 ft); trace gravel. | | | |
| 175 | | | | | Same as above (150 ft); predominantly fine sand; no gravel. | | | Kelly down @ 0921. New 20' connection and resumed drilling @ 0930. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | 0.3 | | Well graded SAND with Gravel (SW); brown (10YR 4/3); damp; dense; 75% fine to coarse sand; rounded; 25% fine gravel to 2cm; subrounded; no odor. | | | |
| 185 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 100% fine to coarse sand; rounded; no odor. | | Filter Pack | |
| 190 | | | | | Same as above (185 ft). | | | |
| 195 | | | | | Same as above (185 ft). | SW | | Kelly down @ 0943. New 5' connection @ 0951. Resumed drilling @ 0952. |
| 200 | | | 0.0 | | Same as above (185 ft); abundant tuff grains. | | Bottom of Screen<br>Bentonite Seal | Kelly down @ 1000. Total depth with 11-3/4" casing. Resumed drilling with 9-5/8" casing @ 1338. |
| 205 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); dry; dense; 55% fine to coarse sand; rounded; 45% fine gravel to 2cm; subrounded; no odor. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 210 | | | | | | | | |

# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND with Gravel (SW); dark yellowish brown (10YR 4/4); dry; dense; 70% fine to coarse sand; rounded; 30% fine gravel to 2cm; rounded; no odor. Note: abundant tuff. | | | |
| 215 | | | | | Same as above (210 ft). | | | Kelly down @ 1345. New 20' connection and resumed drilling @ 1355. |
| 220 | | | 0.0 | | Well graded SAND (SW); brown (10YR 5/3); damp; dense; 90% fine to coarse sand; rounded; 10% fine gravel; rounded; no odor. | | | |
| 225 | | | | | Same as above (220 ft); 100% fine to coarse sand. Note: abundant tuff. | SW | Filter Pack | |
| 230 | | | | | Same as above (220 ft). | | | |
| 235 | | | | | Same as above (220 ft); subrounded; no odor. | | | Kelly down @ 1400. New 20' connection and resumed drilling @ 1407. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | 0.0 | | Elastic SILT (MH); brown (7.5YR 4/3); damp; firm; low to medium plasticity; 100% silt; no odor. | MH | | |
| 245 | | | | | SILT (ML); brown (7.5YR 4/3); damp; firm; non to low plasticity; 100% silt; no odor. | ML | | |
| 250 | | | | | Same as above (245 ft). | | | |
| 255 | | | | | Well graded SAND (SW); brown (10YR 5/3); damp; dense; 100% fine to coarse sand; rounded; no odor. Note: predominantly fine sand. | SW | Filter Pack | Kelly down @ 1412. New 20' connection and resumed drilling @ 1419. |
| 260 | | | 18.2 | | Elastic SILT (MH); brown (7.5YR 4/3); damp; firm; low to medium plasticity; 100% silt; no odor. | MH | | |
| 265 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); damp; dense; 95% fine to medium sand; trace coarse sand; subrounded; 5% fine gravel; subrounded; slight odor. | SP | | |
| 270 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/10/11 11:21 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); damp; dense; 100% fine to medium sand; rounded; slight odor. | SP | | |
| 275 | | | | | No cuttings returned. | | | Kelly down @ 1452. New 20' connection and resumed drilling @ 1508. |
| 280 | | | 7.5 | | SILT (ML); brown (7.5YR 4/3); damp; firm; low plasticity; 100% silt; trace sand; no odor. | ML | | |
| 285 | | | | | Silty SAND (SM); brown (10YR 4/3); damp; dense; 80% fine sand; 20% silt; no odor. | SM | Filter Pack | |
| 290 | | | | | SILT with Sand (ML); brown (7.5YR 4/3); damp; firm; low plasticity; 80% silt; 10% fine to coarse sand; 10% fine gravel; slight odor. | ML | | |
| 295 | | | | | Silty GRAVEL (GM); brown (10YR 4/3); damp; dense; 60% fine gravel to 2cm; subrounded; 10% fine to coarse sand; 30% silt; slight odor. Note: gravel is composed of basalt. | GM | | Kelly down @ 1519. New 20' connection and resumed drilling @ 1527. |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/10/11 11:21 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | 34.2 | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 85% fine to coarse sand; rounded; 15% fine gravel; subangular to subrounded; no odor. | | | |
| 305 | | | | | Same as above (300 ft). | SW | | |
| 310 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 60% fine gravel to 2cm; subrounded; 40% fine to coarse sand; no odor. Note: gravel is composed of basalt. | | | |
| 315 | | | | | Same as above (310 ft). | | Filter Pack | Kelly down @ 1536. New 20' connection and resumed drilling @ 1543. |
| 320 | | | 4.1 | | Same as above (310 ft); moderate odor. | GP | | |
| 325 | | | | | Same as above (310 ft); moderate odor. | | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/10/11 11:21 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); damp; dense; 75% fine to coarse sand; rounded; 25% fine gravel to 1.5cm; subrounded; moderate odor. | | | |
| 335 | | | | | Same as above (330 ft). | | | Kelly down @ 1551. New 20' connection and resumed drilling @ 1558. |
| 340 | | | 9.6 | | Same as above (330 ft); 85% sand; 15% gravel; slight odor. | | Filter Pack | |
| 345 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 90% fine to coarse sand; rounded; 10% fine gravel to 1.5cm; slight odor. | SW | | |
| 350 | | | | | Same as above (345 ft). | | Bottom of Screen<br>Bentonite Seal | |
| 355 | | | | | Same as above (345 ft). | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1606. New 20' connection @ 1611. Resumed drilling @ 1612. |
| 360 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/10/11 11:21 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | 4.9 | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 95% fine to coarse sand; rounded; 5% fine gravel; rounded; slight odor. | | | |
| 365 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); damp; dense; 70% fine to coarse sand; 30% fine gravel to 3cm; rounded; slight odor. | | | |
| 370 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 95% fine to coarse sand; subrounded; 5% fine gravel to 1cm; subangular; moderate odor. | | | |
| 375 | | | | | Same as above (370 ft); moderate odor. | SW | Filter Pack | Kelly down @ 1621. New 20' connection and resumed drilling @ 1629. |
| 380 | | | 105.0 | | Same as above (370 ft); moderate odor. | | | |
| 385 | | | | | Same as above (370 ft); 100% fine to coarse sand; moderate to strong odor. | | | |
| 390 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/10/11 11:21 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); damp; dense; 80% fine gravel; subrounded; 20% fine to coarse sand; strong odor. Note: gravel is composed of basalt. | GP | | |
| 395 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 95% fine to coarse sand; 5% fine gravel; subangular to subrounded; strong odor. | SW | | Kelly down @ 1638. New 20' connection and resumed drilling @ 1645. |
| 400 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); damp; dense; 60% fine to coarse sand; 40% fine gravel; rounded; strong odor. | | | |
| 405 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; dense; 100% fine sand; strong odor. | SP | Filter Pack | |
| 410 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 100% fine to coarse sand; trace fine gravel; strong odor. | SW | | |
| 415 | | | | | Same as above (410 ft); very strong odor. | | | Kelly down @ 1653. End of 9/20/11. New 20' connection and resumed drilling @ 0845 on 9/21/11. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | 1046.0 | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 95% fine to coarse sand; subrounded; 5% fine gravel; subangular; very strong odor. | SW | Filter Pack | Kelly down @ 0900. New 20' connection and resumed drilling @ 0907. |
| 425 | | | | | Same as above (420 ft). | | | |
| 430 | | | | | Same as above (420 ft). | | | |
| 435 | | | | | Same as above (420 ft); 100% fine to coarse sand; trace gravel; very strong odor. | | | |
| 440 | | | 603.0 | | Sandy SILT (ML); brown (7.5YR 5/4); damp; firm; nonplastic; 70% silt; 30% fine sand; very strong odor. | ML | | |
| 445 | | | | | Silty SAND (SM); brown (10YR 5/3); damp; dense; 70% fine to medium sand; 30% silt; very strong odor. | SM | | |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; dense; 95% fine to medium sand; 5% silt and clay; very strong odor. | SP | | |
| 455 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 100% fine to coarse sand; rounded; very strong odor. | SW | | Kelly down @ 0924. New 20' connection @ 0934. Resumed drilling @ 0946. |
| 460 | | | 313.0 | | Same as above (455 ft); trace gravel to 3cm; trace clay nodules. | | | |
| 465 | | | | | Same as above (455 ft); trace gravel to 1cm. | | Filter Pack | |
| 470 | | | | | Same as above (455 ft). | | | |
| 475 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); damp; dense; 80% fine gravel to 1cm; rounded; 20% fine to coarse sand; strong odor. Note: gravel is composed of basalt. | GP | | Kelly down @ 0958. New connection and resumed drilling @ 1019. |
| 480 | | | | | | | | |

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# Borehole ID: KAFB-106150

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/19/2011
Date TD Reached: 9/21/2011
Date Completed: 9/23/2011

Ground Elevation AMSL (ft): 5344.2
Y Coordinate: 1473222.53
X Coordinate: 1541661.26

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | 13.8 | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 95% fine to coarse sand; rounded; 5% silt and clay; moderate odor. | SW | Bottom of Screen | |
| 485 | | | | | Same as above (480 ft); slight to moderate odor. | | | Total depth = 486 ft. Reached @ 1031 on 9/21/11. |
| 490 | | | | | | | | Water added during drilling (gallons) = 0 |
| | | | | | | | | Water added after drilling (gallons) = 0 |
| 495 | | | | | | | | PID measurements obtained from cuttings placed in jar. |
| 500 | | | | | | | | |
| 505 | | | | | | | | |
| 510 | | | | | | | | |

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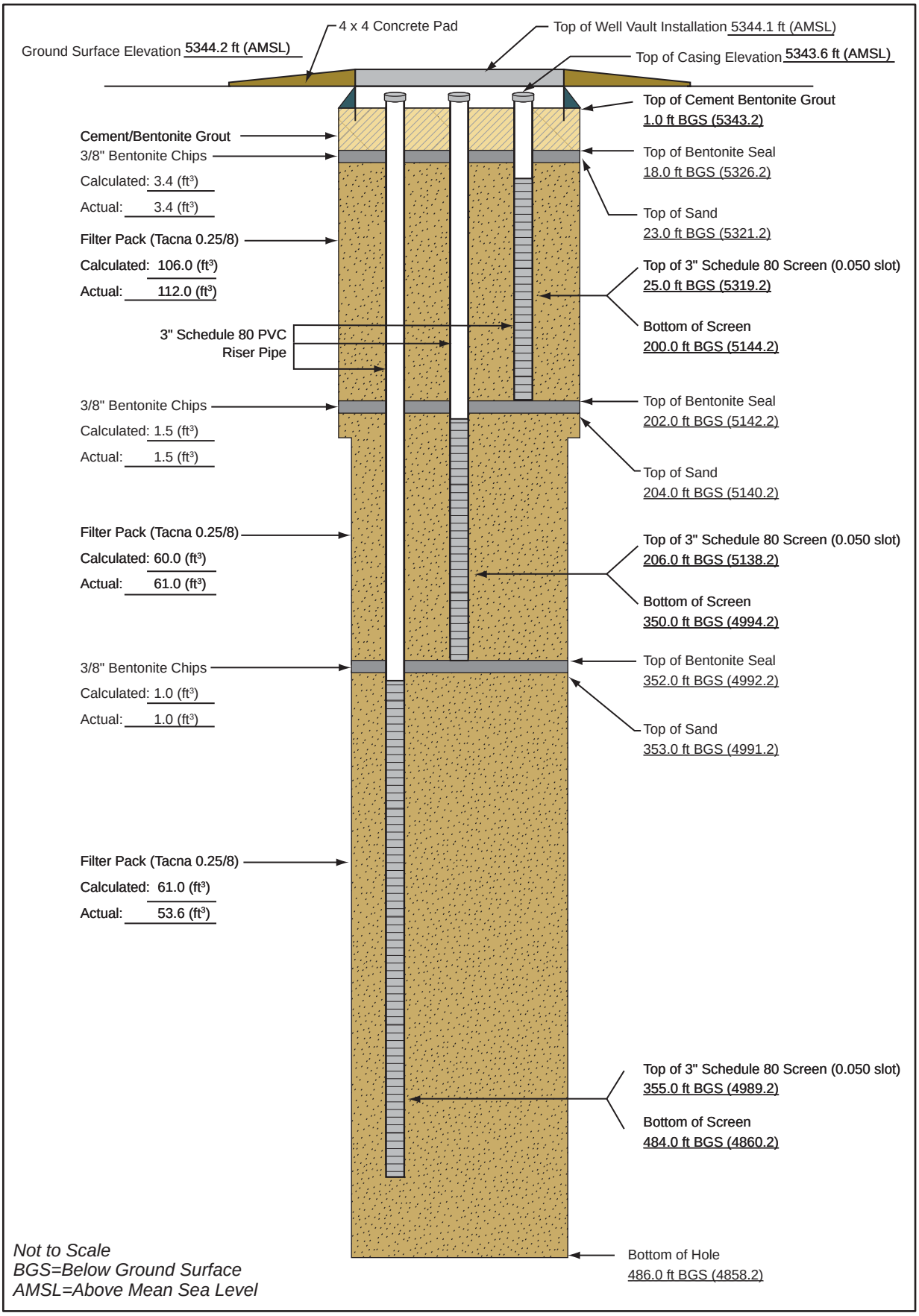
# PneuLog Well Completion Diagram KAFB-106150

Installation Start Date/Time: 9/21/2011@12:00
Installation End Date/Time: 9/23/2011@12:00




140705.EA010020_106150

# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 33.9 | | SILT with SAND (ML); brown (7.5YR 5/3); dry; soft; nonplastic; 85% silt; 15% fine to coarse sand; rounded; no odor. | | | Hand augered. |
| 5 | | | | | SILT (ML); brown (7.5YR 5/4); damp; soft; 95% silt; nonplastic; 5% fine to medium sand; no odor. | | | Began drilling @ 1000 on 9/26/11. |
| 10 | | | | | Same as above (5 ft). | | Cement Bentonite Grout | |
| 15 | | | | | Same as above (5 ft); brown (7.5YR 4/4); trace fine gravel; angular. | ML | | Kelly down @ 1015. New 20' connection @ 1015. Resumed drilling @ 1024. |
| 20 | | | 5.3 | | Same as above (5 ft); low plasticity. | | Bentonite Seal<br>Top of Filter Pack | |
| 25 | | | | | Same as above (5 ft); non to low plasticity; trace sand; no odor. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 30 | | | | | | | | |

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# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Elasitc SILT (MH); dark brown (7.5YR 3/4); damp; soft; low to medium plasticity; 100% silt; no odor. | | | |
| 35 | | | | | Same as above (30 ft); brown (7.5YR 4/2); no odor. | MH | | Kelly down @ 1035. New 20' connection and resumed drilling @ 1041. |
| 40 | | | 1.6 | | Same as above (30 ft). | | | |
| 45 | | | | | SILT (ML); brown (7.5YR 4/4); damp; soft; nonplastic; 90% silt; 10% fine to coarse sand; trace gravel; no odor. | | Filter Pack | |
| 50 | | | | | Same as above (45 ft); non to low plasticity; 95% silt; 5% fine gravel; angular; no odor. | ML | | |
| 55 | | | | | SILT with Gravel (ML); brown (7.5YR 4/4); damp; soft; low plasticity; 85% silt; 10% fine gravel; subrounded; 5% sand; no odor. | | | Kelly down @ 1047. New 20' connection and resumed drilling @ 1059. |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | 0.0 | | SILT with Gravel (ML); brown (7.5YR 4/4); damp; soft; low plasticity; 80% silt; 15% fine gravel; subangular; 5% sand; no odor. | | | |
| 65 | | | | | SILT (ML); yellowish brown (10YR 5/6); damp; soft; nonplastic; 100% silt; no odor. | | | |
| 70 | | | | | Same as above (65 ft); brown (7.5YR 5/4); 90% silt; 5% gravel; subrounded; 5% sand; no odor. | | | |
| 75 | | | | | Same as above (65 ft). | ML | Filter Pack | Kelly down @ 1106. New 20' connection @ 1117. Resumed drilling @ 1118. |
| 80 | | | 0.5 | | Same as above (65 ft); brown (7.5YR 5/3). | | | |
| 85 | | | | | Same as above (65 ft); brown (7.5YR 4/4). | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; trace tuff grains; no odor. | | | Approximate top of Santa Fe Group. |
| 95 | | | | | Same as above (90 ft). | | | Kelly down @ 1129. New 20' connection @ 1135. Resumed drilling @ 1136. |
| 100 | | | 0.0 | | Same as above (90 ft). | SW | | |
| 105 | | | | | Same as above (90 ft). | | Filter Pack | |
| 110 | | | | | SILT (ML); brown (7.5YR 5/4); damp; firm; non to low plasticity; 100% silt; no odor | | | |
| 115 | | | | | Same as above (110 ft). | ML | | Kelly down @ 1142. New 20' connection @ 1150. Resumed drilling @ 1151. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | 0.5 | | SILT (ML); yellowish brown (10YR 5/4); damp; firm; nonplastic; 100% silt; trace clay nodules; no odor. | ML | | |
| 125 | | | | | Elastic SILT (MH); brown (10YR 4/3); damp; firm; low to medium plasticity; 100% silt; trace clay nodules; no odor. | MH | | |
| 130 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; rounded; no odor. | | | |
| 135 | | | | | Same as above (130 ft). | SW | Filter Pack | Kelly down @ 1205. New 20' connection @ 1302. Resumed drilling @ 1304. |
| 140 | | | | | Same as above (130 ft). | | | |
| 145 | | | | | SILT (ML); brown (7.5YR 5/4); damp; firm; low plasticity; 100% silt; no odor | ML | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Well graded SAND (SW); brown (10YR 4/3); 100% fine to coarse sand; rounded; no odor. | | | |
| 155 | | | | | Same as above (150 ft); abundant tuff. | | | Kelly down @ 1315. New 20' connection @ 1322. Resumed drilling @ 1322. |
| 160 | | | 0.5 | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 75% fine to coarse sand; 25% fine gravel to 1cm; subrounded; no odor. Note: abundant tuff. | | | |
| 165 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% fine to coarse sand; rounded; 10% fine gravel; subrounded; no odor. Note: abundant tuff. | SW | Filter Pack | |
| 170 | | | | | Same as above (165 ft); 100% fine to coarse sand. | | | |
| 175 | | | | | Same as above (165 ft); 95% fine to coarse sand; 5% gravel; no odor. | | | Kelly down @ 1332. New 20' connection @ 1428. Resumed drilling @ 1430. |
| 180 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 15:21 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | 0.3 | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; rounded; no odor. Note: abundant tuff. | SW | Filter Pack | |
| 185 | | | | | Same as above (180 ft). | | | |
| 190 | | | | | Same as above (180 ft). | | | |
| 195 | | | | | Silty SAND (SM); light olive brown (2.5Y 5/4); damp; dense; 70% fine sand; 30% silt; no odor. | SM | | Kelly down @ 1441. New 5' connection and resumed drilling @ 1447. |
| 200 | | | 0.0 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded to rounded; no odor. | SW | Bottom of Screen<br>Bentonite Seal | Kelly down @ 1500. End of 9/26/11. Total depth with 11-3/4" casing. Resumed drilling with 9-5/8" casing @ 0845 on 9/27/11. |
| 205 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 65% fine gravel to 2cm; subrounded; 35% fine to coarse sand; no odor. Note: gravel is composed of basalt. | GP | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 95% fine to coarse sand; subrounded; 5% gravel to 3cm; no odor. | | | |
| 215 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 65% fine to coarse sand; subrounded; 35% gravel to 3cm; subrounded; no odor. | | | Kelly down @ 0851. New 20' connection and resumed drilling @ 0859. |
| 220 | | | 0.2 | | Same as above (215 ft); 85% fine to coarse sand; 15% gravel. Note: some gravel is composed of obsidian. | | | |
| 225 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subrounded to rounded; trace gravel; no odor. | SW | Filter Pack | |
| 230 | | | | | Same as above (225 ft); 90% fine to coarse sand; subrounded; 10% fine gravel; subrounded; trace clay nodules; no odor. | | | |
| 235 | | | | | Same as above (225 ft); 100% fine to coarse sand; no odor. | | | Kelly down @ 0903. New 20' connection and resumed drilling @ 0910. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | 14.1 | | Lean CLAY (CL); reddish brown (5YR 4/4); damp; firm; medium to high plasticity; 100% clay; no odor. | CL | | |
| 245 | | | | | Sandy SILT (ML); pale brown (10YR 6/3); dry; firm; nonplastic; 60% silt; 40% fine sand; no odor. | ML | | |
| 250 | | | | | Elastic SILT (MH); brown (7.5YR 5/3); damp; firm; low to medium plasticity; 100% silt; no odor | MH | | |
| 255 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 95% fine sand; 5% silt and clay; no odor. | SP | Filter Pack | Kelly down @ 0917. New 20' connection and resumed drilling @ 0924. |
| 260 | | | 3.0 | | SILT (ML); brown (10YR 5/3); damp; firm; nonplastic; 95% silt; 5% fine sand; no odor. | ML | | |
| 265 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | SW | | |
| 270 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 15:21 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Elasitc SILT (MH); brown (7.5YR 4/4); damp; firm; low to medium plasticity; 100% silt; no odor. | | | Pulled casing out. Rubber collar was dragging between casing. |
| 275 | | | | | Same as above (270 ft). | MH | | Kelly down @ 0957. New connection and resumed drilling @ 1003. |
| 280 | | | 0.0 | | Silty SAND (SM); brown (10YR 4/3); damp; dense; 70% fine sand; 30% silt; no odor. | SM | | |
| 285 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 100% fine to medium sand; rounded; no odor. | SP | Filter Pack | |
| 290 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; rounded; 5% silt and clay; no odor. | | | |
| 295 | | | | | Same as above (290 ft); 100% fine to coarse sand; subrounded; trace fine gravel; no odor. | SW | | Kelly down @ 1015. New 20' connection and resumed drilling @ 1025. |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | 0.0 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subrounded; 5% fine gravel to 2.5cm; subrounded; no odor | | | |
| 305 | | | | | Same as above (300 ft). | SW | | |
| 310 | | | | | Poorly graded GRAVEL (GP); brown (10YR 4/3); dry; dense; 95% fine gravel to 3cm; subrounded to rounded; 5% fine to coarse sand; no odor. Note: gravel is composed of basalt. | GP | | |
| 315 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; rounded; 5% fine gravel to 2cm; subrounded; no odor. | | Filter Pack | Kelly down @ 1033. New 20' connection @ 1039. Resumed drilling @ 1040. |
| 320 | | | 0.0 | | Same as above (315 ft); trace gravel. | SW | | |
| 325 | | | | | Same as above (315 ft); 95% fine to coarse sand; 5% silt nodules. | | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% fine to coarse sand; rounded; 10% fine gravel; rounded; no odor. | | | |
| 335 | | | | | Same as above (330 ft); 95% fine to coarse sand; 5% gravel. | | | Kelly down @ 1048. New 20' connection @ 1053. Resumed drilling @ 1054. |
| 340 | | | 0.0 | | Same as above (330 ft); 100% fine to coarse sand; trace gravel. | | Filter Pack | |
| 345 | | | | | Same as above (330 ft); 95% fine to coarse sand; 5% gravel; trace silt nodules. | SW | | |
| 350 | | | | | Same as above (330 ft); subrounded gravel. | | Bottom of Screen<br>Bentonite Seal | |
| 355 | | | | | Same as above (330 ft); 95% fine to coarse sand; 5% gravel. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1107. New 20' connection @ 1115. Resumed drilling @ 1116. |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | 0.0 | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 55% fine to coarse sand; 45% fine gravel; rounded; no odor. Note: gravel is composed of basalt. | | | |
| 365 | | | | | Same as above (360 ft); 85% fine to coarse sand; 15% fine gravel to 3cm; subrounded. | SW | | |
| 370 | | | | | Same as above (360 ft). | | | |
| 375 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 95% fine to medium sand; 5% silt nodules; no odor. | SP | Filter Pack | Kelly down @ 1122. New 20' connection and resumed drilling @ 1128. |
| 380 | | | 0.0 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | | | |
| 385 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 70% fine to coarse sand; 30% fine gravel; subrounded; no odor. | SW | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; no odor. | | | |
| 395 | | | | | Same as above (390 ft). | | | Kelly down @ 1138. New 20' connection and resumed drilling @ 1148. |
| 400 | | | 0.0 | | Same as above (390 ft). | | | |
| 405 | | | | | Same as above (390 ft); trace gravel. | SW | Filter Pack | |
| 410 | | | | | Same as above (390 ft). | | | |
| 415 | | | | | Same as above (390 ft). | | | Kelly down @ 1200. New 20' connection @ 1322. Resumed drilling @ 1324. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | 0.0 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; slight odor. | | | |
| 425 | | | | | Same as above (420 ft); 95% fine to coarse sand; 5% silt nodules; no odor. | | | |
| 430 | | | | | Same as above (420 ft). | SW | | |
| 435 | | | | | Same as above (420 ft); 95% fine to coarse sand; 5% fine gravel to 1cm; rounded. | | Filter Pack | Kelly down @ 1340. New 20' connection and resumed drilling @ 1346. |
| 440 | | | 0.0 | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); dry; dense; 100% fine to medium sand; trace fine gravel; angular; no odor. | SP | | |
| 445 | | | | | SILT (ML); light olive brown (2.5Y 5/3); damp; firm; nonplastic; 100% silt; no odor. | ML | | |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Poorly graded SAND (SP); olive brown (2.5Y 4/3); dry; dense; 95% fine to medium sand; rounded; 5% silt and clay; no odor. | SP | | |
| 455 | | | | | No cuttings returned. | | | Kelly down @ 1359. New 20' connection and resumed drilling @ 1410. |
| 460 | | | 6.9 | | Poorly graded SAND with Silt (SP-SM); light olive brown (2.5Y 5/3); damp; dense; 90% fine to medium sand; rounded; 10% silt; slight odor. | SP-SM | | |
| 465 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 100% fine to medium sand; trace coarse sand; slight odor. | | Filter Pack | |
| 470 | | | | | Same as above (465 ft). | SP | | |
| 475 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; slight odor. | SW | | Kelly down @ 1432. New 20' connection and resumed drilling @ 1440. |
| 480 | | | | | | | | |

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# Borehole ID: KAFB-106151

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 9/26/2011
Date TD Reached: 9/27/2011
Date Completed: 9/30/2011

Ground Elevation AMSL (ft): 5345.3
Y Coordinate: 1473745.55
X Coordinate: 1541673.85

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | | | | | | |
| | | | 18.1 | | Silty SAND (SM); brown (10YR 4/3); damp; dense; 85% fine to medium sand; 15% silt; slight odor. | SM | Bottom of Screen | |
| 485 | | | | | Well graded SAND with Silt (SW-SM); brown (10YR 4/3); damp; dense; 90% fine to coarse sand; rounded; 10% silt; trace gravel; slight odor. | SW-SM | | |
| 490 | | | | | | | | Total depth = 488 ft. Reached @ 1450 on 9/27/11. |
| | | | | | | | | Water added during drilling (gallons) = 0 |
| 495 | | | | | | | | Water added after drilling (gallons) = 0 |
| | | | | | | | | PID measurements obtained from cuttings placed in a jar. |
| 500 | | | | | | | | |
| 505 | | | | | | | | |
| 510 | | | | | | | | |

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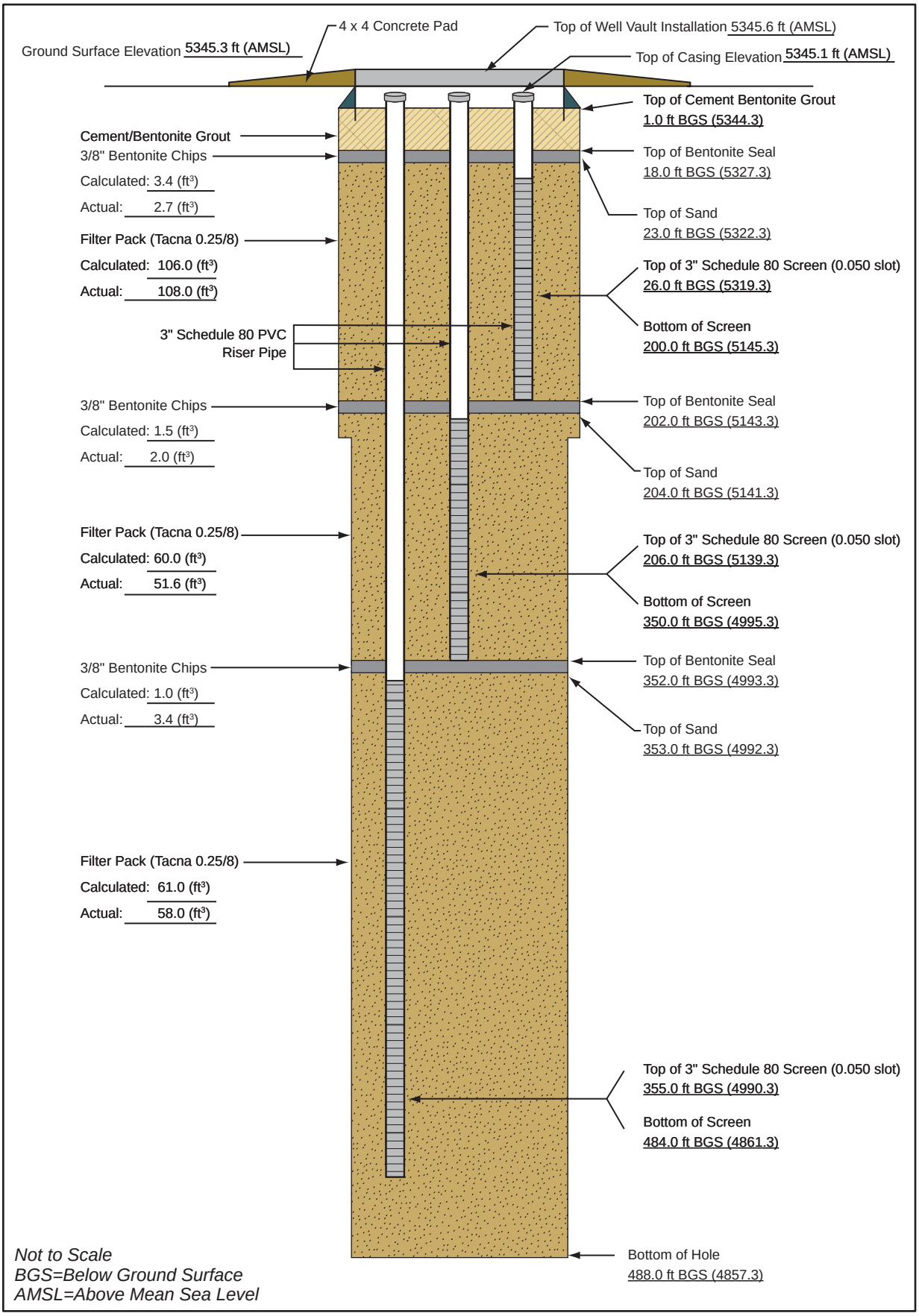
# PneuLog Well Completion Diagram KAFB-106151

Installation Start Date/Time: 9/28/2011@08:00
Installation End Date/Time: 9/30/2011@12:00




140705.EA010020_106151

# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 2.6 | | SILT (ML); brown (7.5YR 5/4); dry; soft; nonplastic; 100% silt; no odor. | | | Hand augered. |
| 5 | | | | | Same as above (0 ft); brown (7.5YR 4/4). | | Cement Bentonite Grout | Began drilling @ 1619 on 10/3/11. |
| 10 | | | | | Same as above (0 ft); dark yellowish brown (10YR 4/6); damp; trace coarse sand. | | | |
| 15 | | | | | Same as above (0 ft). | ML | Bentonite Seal | Kelly down @ 1632. New 20' connection @ 1641. Resumed drilling @ 1641. |
| 20 | | | 0.0 | | Same as above (0 ft). | | Top of Filter Pack; Top of 3" Schedule 80 PVC 0.050 Slot Screen | Slight bit chatter. |
| 25 | | | | | Same as above (0 ft); non to low plasticity. | | | |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 15:57 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); brown (7.5YR 4/4); damp; soft; non to low plasticity; 100% silt; trace gravel; no odor. | | | |
| 35 | | | | | Same as above (30 ft). | | | Kelly down @ 1650. New 20' connection @ 1658. Resumed drilling @ 1658. |
| 40 | | | 0.0 | | Same as above (30 ft); strong brown (7.5YR 4/6). | | | |
| 45 | | | | | Same as above (30 ft). | ML | Filter Pack | |
| 50 | | | | | Same as above (30 ft); 95% silt; 5% gravel to 1cm. | | | |
| 55 | | | | | Same as above (30 ft). | | | Kelly down @ 1711. End of 10/3/11. New 20' connection @ 0742 on 10/4/11. Resumed drilling @ 0745. |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | 0.0 | | SILT (ML); brown (7.5YR 4/4); damp; soft; nonplastic; 100% silt; no odor. | | | |
| 65 | | | | | Same as above (60 ft); 95% silt; 5% gravel to 1cm; angular; no odor. Note: gravel is composed of granite. | | | |
| 70 | | | | | Same as above (60 ft). | | | |
| 75 | | | | | Same as above (60 ft); strong brown (7.5YR 4/6); non to low plasticity. | ML | Filter Pack | Kelly down @ 0756. New 20' connection @ 0804. Resumed drilling @ 0804. |
| 80 | | | 0.1 | | Same as above (60 ft); strong brown (7.5YR 5/6); trace coarse sand; angular. | | | |
| 85 | | | | | Same as above (60 ft); non to low plasticity; trace coarse sand; angular. Note: sand is composed of granite. | | | |
| 90 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 15:57 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); yellowish brown (10YR 5/6); damp; soft; non to low plasticity; 100% silt; no odor. | ML | | |
| 95 | | | | | Silty SAND (SM); light olive brown (2.5Y 5/4); damp; dense; 70% fine sand; 30% silt; no odor. | SM | | Kelly down @ 0819. New 20' connection @ 0826. Resumed drilling @ 0826. |
| 100 | | | 0.2 | | Poorly graded SAND (SP); brown (10YR 4/3); damp; dense; 95% fine to medium sand; trace coarse sand; 5% silt and clay; no odor. | SP | | Approximate top of Santa Fe Group. |
| 105 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; abundant tuff; no odor. | SW | Filter Pack | |
| 110 | | | | | SILT (ML); yellowish brown (10YR 5/6); damp; firm; nonplastic; 90% silt; 10% gravel to 1.5cm; angular; no odor. | ML | | |
| 115 | | | | | Same as above (110 ft); 100% silt; no odor. | | | Kelly down @ 0835. New 20' connection @ 0842. Resumed drilling @ 0842. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | 0.0 | | SILT (ML); light olive brown (2.5Y 5/4); damp; firm; low plasticity; 100% silt; no odor. | | | |
| 125 | | | | | Same as above (120 ft). | ML | | |
| 130 | | | | | Same as above (120 ft); non to low plasticity. | | | |
| 135 | | | | | Elastic SILT (MH); light olive brown (2.5Y 5/3); damp; firm; low to medium plasticity; 100% silt; no odor. | MH | Filter Pack | Kelly down @ 0905. New 20' connection @ 0912. Resumed drilling @ 0912. |
| 140 | | | 0.7 | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; rounded; abundant tuff; no odor. | SW | | |
| 145 | | | | | Same as above (138 ft). | | | |
| 150 | | | | | SILT (ML); yellowish brown (10YR 5/6); damp; firm; non to low plasticity; 100% silt; no odor. | ML | | |

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# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | SILT (ML); yellowish brown (10YR 5/6); damp; firm; non to low plasticity; 100% silt; no odor. | ML | | |
| 155 | | | | | Well graded SAND with Silt (SW-SM); light olive brown (2.5Y 5/3); damp; dense; 90% fine to coarse sand; rounded; 10% silt; no odor. | SW-SM | | Kelly down @ 0920. New 20' connection @ 0927. Resumed drilling @ 0927. |
| 160 | | | | | Well graded SAND (SW); light olive brown (2.5Y 5/4); damp; dense; 85% fine to coarse sand; rounded; 10% gravel to 1cm; subrounded; 5% silt and clay; no odor. | SW | | |
| 165 | | | | | Silty SAND (SM); light olive brown (2.5Y 5/4); damp; dense; 80% fine to coarse sand; rounded; 20% silt; no odor. | SM | Filter Pack | |
| 170 | | | | | Well graded SAND (SW); brown (10YR 5/3); damp; dense; 95% fine to coarse sand; rounded; 5% silt and clay; abundant tuff; no odor. | SW | | |
| 175 | | | | | Same as above (170 ft); 100% sand; trace gravel. | | | Kelly down @ 0935. New 5' connection @ 0945. Resumed drilling @ 0945. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | 0.2 | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 100% fine to coarse sand; rounded; abundant tuff; no odor. | SW | | Kelly down @ 0950. Total depth with 11-3/4" casing. Resumed drilling with 9-5/8" casing @ 1326. |
| 185 | | | | | Silty SAND (SM); brown (7.5YR 4/4); damp; dense; 80% fine to coarse sand; 20% silt; no odor. | SM | Filter Pack | |
| 190 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; rounded; abundant tuff; no odor. | | | |
| 195 | | | | | Same as above (190 ft). | SW | Bottom of Screen<br>Bentonite Seal | Kelly down @ 1332. New 20' connection @ 1355. Resumed drilling @ 1355. |
| 200 | | | 0.1 | | Same as above (190 ft); trace gravel; subangular. | | | |
| 205 | | | | | SILT (ML); olive brown (2.5Y 4/4); moist; firm; low plasticity; 100% silt; no odor. | ML | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | | | | |
| | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% fine to coarse sand; subrounded; 10% gravel to 2cm; subrounded; no odor. | SW | | |
| 215 | | | | | | | | |
| | | | | | SILT (ML); light olive brown (2.5Y 5/4); damp; firm; non to low plasticity; 100% silt; no odor. | ML | | Kelly down @ 1401. New 20' connection @ 1408. Resumed drilling @ 1408. |
| 220 | | | 0.6 | | | | | |
| | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | SW | Filter Pack | |
| 225 | | | | | | | | |
| | | | | | Same as above (220 ft); trace gravel; trace clay nodules. | | | |
| 230 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine sand; no odor. | SP | | |
| 235 | | | | | | | | |
| | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; trace gravel; no odor. | SW | | Kelly down @ 1414. New 20' connection @ 1427. Resumed drilling @ 1428. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | 0.4 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; 5% silt and clay; no odor. | SW | | |
| 245 | | | | | Same as above (240 ft). | | | |
| 250 | | | | | Same as above (240 ft); trace gravel to 3cm; subangular. Note: gravel is composed of tuff. | | | |
| 255 | | | | | SILT (ML); olive brown (2.5Y 4/4); damp; dense; non to low plasticity; 100% silt; trace gravel to 3cm; no odor. | ML | Filter Pack | Kelly down @ 1438. New 20' connection @ 1444. Resumed drilling @ 1444. |
| 260 | | | 14.0 | | Sandy SILT (ML); light olive brown (2.5Y 5/4); dry; firm; nonplastic; 60% silt; 40% sand; subrounded; no odor. | | | |
| 265 | | | | | SILT (ML); olive brown (2.5Y 4/4); damp; firm; nonplastic; 95% silt; 5% fine sand; no odor. | | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Well graded SAND (SW); light olive brown (2.5Y 5/4); damp; dense; 100% fine to coarse sand; subrounded; no odor. | SW | | |
| 275 | | | | | Silty SAND (SM); olive brown (2.5Y 4/4); dry; dense; 60% fine to medium sand; 40% silt; no odor. | SM | | Kelly down @ 1454. New 20' connection @ 1503. Resumed drilling @ 1503. |
| 280 | | | 0.4 | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 95% fine to medium sand; 5% silt and clay; no odor. | | | |
| 285 | | | | | Same as above (280 ft). | SP | Filter Pack | |
| 290 | | | | | Same as above (280 ft). | | | |
| 295 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; rounded; no odor. | SW | | Kelly down @ 1509. New 20' connection @ 1514. Resumed drilling @ 1514. |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | 0.5 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; rounded; no odor. | | | |
| 305 | | | | | Well graded SAND with Gravel (SW); light olive brown (2.5Y 5/4); damp; dense; 85% fine to coarse sand; 15% fine gravel to 1.5cm; subrounded; no odor. | | | |
| 310 | | | | | Same as above (305 ft); 80% sand; 20% gravel. | | | |
| 315 | | | | | Same as above (305 ft). | SW | Filter Pack | Kelly down @ 1521. New 20' connection @ 1528. Resumed drilling @ 1528. |
| 320 | | | 0.8 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% fine to coarse sand; subrounded to rounded; 10% gravel to 3cm; rounded; no odor. | | | |
| 325 | | | | | Same as above (320 ft); light olive brown (2.5Y 5/4). | | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular; no odor. | SW | | |
| 335 | | | | | Same as above (330 ft); light olive brown (2.5Y 5/4); 95% sand; 5% fine gravel to 1.5cm; rounded. | | | Kelly down @ 1537. New 20' connection @ 1544. Resumed drilling @ 1544. |
| 340 | | | 9.5 | | Elastic SILT (MH); olive brown (2.5Y 4/4); damp; firm; low to medium plasticity; 100% silt; no odor. | MH | Filter Pack | |
| 345 | | | | | Same as above (340 ft). | | | |
| 350 | | | | | Well graded SAND with Silt (SW-SM); light olive brown (2.5Y 5/6); damp; dense; 90% fine to coarse sand; subangular to subrounded; 10% silt; no odor. | SW-SM | Bottom of Screen<br>Bentonite Seal | |
| 355 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subrounded; 5% fine gravel; rounded; no odor. | SW | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1554. New 20' connection @ 1601. Resumed drilling @ 1601. |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | 1.5 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; 5% gravel; no odor. | | | |
| 365 | | | | | Same as above (360 ft); 100% sand. | | | |
| 370 | | | | | Same as above (360 ft). | SW | | |
| 375 | | | | | Same as above (360 ft). | | Filter Pack | Kelly down @ 1612. New 20' connection @ 1623. Resumed drilling @ 1623. |
| 380 | | | 0.3 | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 100% fine to medium sand; no odor. | SP | | |
| 385 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | SW | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | | | |
| 395 | | | | | Same as above (390 ft); 95% sand; 5% gravel; rounded. | | | Kelly down @ 1637. New 20' connection @ 1647. Resumed drilling @ 1648. |
| 400 | | | 0.0 | | Same as above (390 ft); trace gravel. | SW | | |
| 405 | | | | | Same as above (390 ft). | | Filter Pack | |
| 410 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 100% fine to medium sand; no odor. | | | |
| 415 | | | | | Same as above (410 ft). | SP | | Kelly down @ 1654. End of 10/4/11. New 20' connection @ 0857 on 10/5/11. Resumed drilling @ 0859. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | 0.6 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; rounded; no odor. | | | |
| 425 | | | | | Same as above (420 ft); subangular to subrounded. | SW | | |
| 430 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 100% fine to medium sand; rounded; trace fine gravel; subangular; no odor. | SP | | |
| 435 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subrounded; 5% fine gravel to 1.5cm; subrounded; no odor. | | Filter Pack | Kelly down @ 0910. New 20' connection @ 0918. Resumed drilling @ 0918. |
| 440 | | | 1.0 | | Same as above (435 ft); 100% fine to coarse sand; subangular; no odor. | SW | | |
| 445 | | | | | Same as above (435 ft). | | | |
| 450 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 15:57 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Well graded SAND with Silt (SW-SM); light olive brown (2.5Y 5/4); damp; dense; 90% fine to coarse sand; subrounded; trace gravel; 10% silt; slight odor. | SW-SM | | |
| 455 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; dense; 95% fine to medium sand; rounded; trace fine gravel to 1cm; 5% silt; slight odor. | | | Kelly down @ 0933. New 20' connection @ 0947. Resumed drilling @ 0947. |
| 460 | | | 2.2 | | Same as above (455 ft); 100% fine to medium sand; subangular; slight odor. | SP | | |
| 465 | | | | | Same as above (455 ft); slight odor. | | Filter Pack | |
| 470 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 100% fine to coarse sand; subrounded; slight to moderate odor. | | | |
| 475 | | | | | Same as above (470 ft); moderate odor. | SW | | Kelly down @ 1000. New connection @ 1009. Resumed drilling @ 1009. |
| 480 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 15:57 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106152

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/3/2011
Date TD Reached: 10/5/2011
Date Completed: 10/7/2011

Ground Elevation AMSL (ft): 5347.4
Y Coordinate: 1473668.59
X Coordinate: 1541962.34

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | 8.0 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; slight to moderate odor. | SW | Bottom of Screen | |
| 485 | | | | | Same as above (480 ft). | | | |
| 490 | | | | | | | | Total depth = 488.5 ft. Reached @ 1020 on 10/5/11. |
| | | | | | | | | Water added during drilling (gallons) = 0 |
| 495 | | | | | | | | Water added after drilling (gallons) = 0 |
| | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 500 | | | | | | | | PID measurements obtained from cuttings placed in a jar. |
| 505 | | | | | | | | |
| 510 | | | | | | | | |

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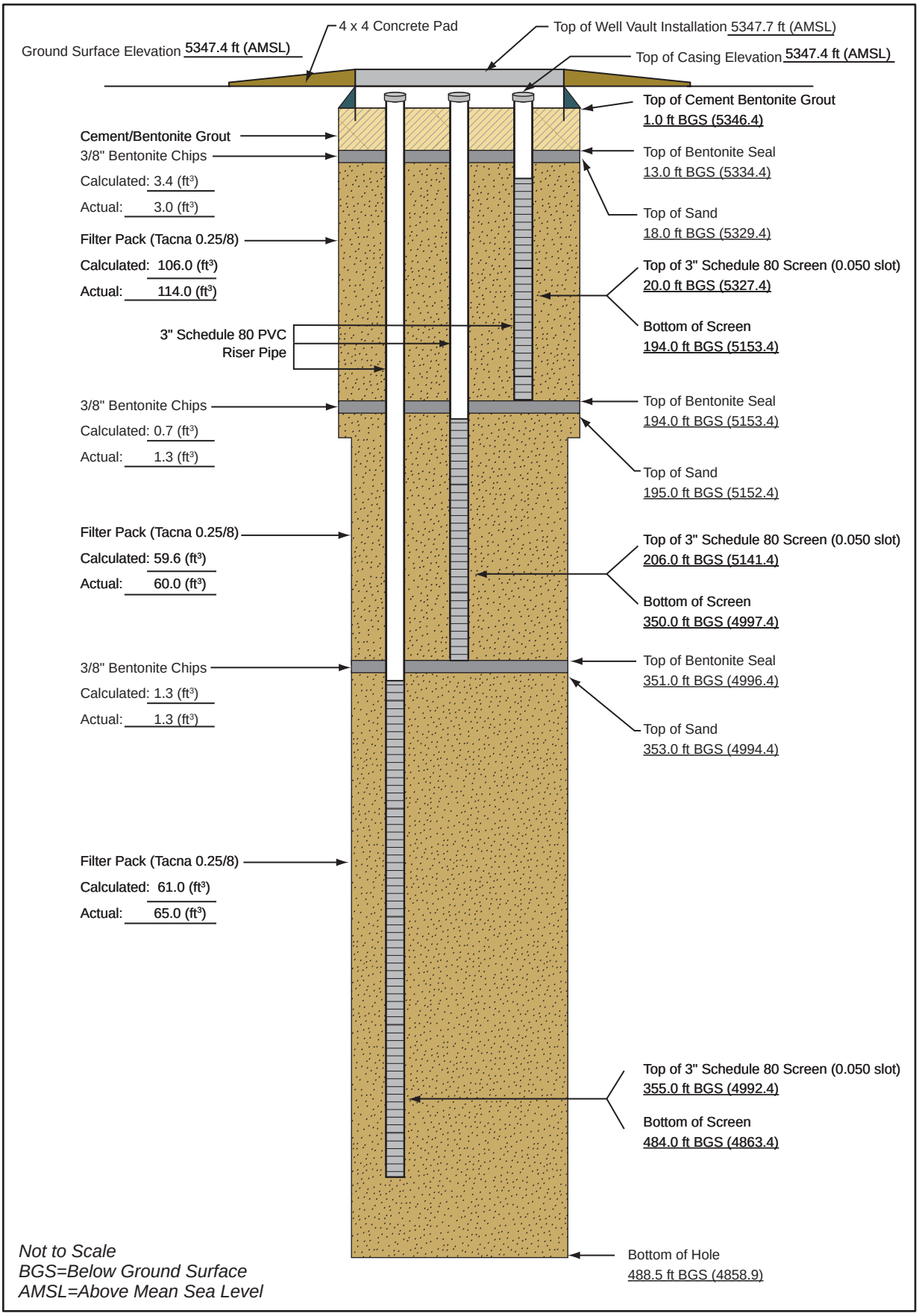
# PneuLog Well Completion Diagram KAFB-106152

Installation Start Date/Time: 10/05/2011@12:00
Installation End Date/Time: 10/07/2011@12:20




140705.EA010020_106152

# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 0.1 | | SILT (ML); brown (7.5YR 4/3); dry; soft; nonplastic; 95% silt; 5% fine sand; no odor. | | | Hand augered. |
| 5 | | | | | Same as above (0 ft); caliche nodules to 1cm. | | | Began drilling @ 0817 on 10/11/11. |
| 10 | | | | | Same as above (0 ft). | ML | Cement Bentonite Grout | |
| 15 | | | | | SILT (ML); brown (7.5YR 4/4); dry; soft; non to low plasticity; 100% silt; no odor. | | | Kelly down @ 0830. New 20' connection @ 0841. Resumed drilling @ 0841. |
| 20 | | | 0.0 | | Elastic SILT (MH); brown (7.5YR 4/3); damp; firm; low to medium plasticity; 100% silt; no odor. | MH | Bentonite Seal | |
| 25 | | | | | SILT (ML); brown (7.5YR 4/4); damp; firm; non to low plasticity; 100% silt; trace coarse sand; angular; no odor. | ML | Top of Filter Pack<br>Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 16:10 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); strong brown (7.5YR 4/6); damp; firm; low plasticity; 100% silt; trace caliche nodules; no odor. | | | |
| 35 | | | | | Same as above (30 ft); non to low plasticity. | | | Kelly down @ 0859. New 20' connection @ 0906. Resumed drilling @ 0906. |
| 40 | | | 1.5 | | Same as above (30 ft). | | | |
| 45 | | | | | Sandy SILT (ML); yellowish brown (10YR 5/4); dry; firm; nonplastic; 60% silt; 40% fine to coarse sand; angular; no odor. | ML | Filter Pack | |
| 50 | | | | | SILT (ML); brown (7.5YR 4/4); damp; firm; low plasticity; 95% silt; 5% gravel to 1cm; no odor. | | | |
| 55 | | | | | Same as above (50 ft). | | | Kelly down @ 0923. New 20' connection @ 0932. Resumed drilling @ 0932. |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | 0.0 | | Sandy SILT (ML); brown (7.5YR 4/4); damp; firm; nonplastic; 65% silt; 35% fine to coarse sand; angular; trace gravel to 1cm; angular; no odor. | | | |
| 65 | | | | | SILT (ML); brown (7.5YR 4/4); dry; firm; non to low plasticity; 100% silt; trace gravel; no odor. | | | |
| 70 | | | | | Same as above (65 ft); nonplastic; 95% silt; 5% fine to coarse sand; angular; no odor. | | | |
| 75 | | | | | Same as above (65 ft); brown (7.5YR 5/4). | ML | Filter Pack | Kelly down @ 0947. New 20' connection @ 0954. Resumed drilling @ 0954. |
| 80 | | | 0.1 | | Same as above (65 ft); low plasticity; trace fine sand; no odor. | | | |
| 85 | | | | | Same as above (65 ft); strong brown (7.5YR 5/6); trace fine sand. | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); brown (7.5YR 5/4); damp; firm; low plasticity; 100% silt; trace caliche nodules; no odor. | | | |
| 95 | | | | | Same as above (90 ft); no caliche nodules. | | | Kelly down @ 1011. New 20' connection @ 1057. Resumed drilling @ 1057. |
| 100 | | | 0.0 | | Same as above (90 ft); dark yellowish brown (10YR 4/4); nonplastic; 95% silt; 5% fine sand. | ML | | |
| 105 | | | | | SILT with Sand (ML); dark yellowish brown (10YR 4/4); damp; firm; nonplastic; 80% silt; 20% fine sand; no odor. | | Filter Pack | |
| 110 | | | | | Silty SAND (SM); dark yellowish brown (10YR 4/4); damp; dense; 80% fine sand; rounded; 20% silt; no odor. | SM | | Approximate top of Santa Fe Group. |
| 115 | | | | | Well graded SAND with Silt (SW-SM); dark yellowish brown (10YR 4/4); damp; dense; 90% fine to coarse sand; rounded; 10% silt; no odor. | SW-SM | | Kelly down @ 1107. New 20' connection @ 1116. Resumed drilling @ 1116. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT (ML); brown (7.5YR 4/4); damp; firm; non to low plasticity; 95% silt; 5% fine to coarse sand; angular; no odor. | | | |
| 125 | | | | | Same as above (120 ft). | | | |
| 130 | | | | | Same as above (120 ft); strong brown (7.5YR 5/6); 100% silt; trace sand. | ML | | |
| 135 | | | | | Same as above (120 ft); low plasticity. | | Filter Pack | Kelly down @ 1134. New 20' connection @ 1151. Resumed drilling @ 1151. |
| 140 | | | 0.0 | | SILT with Sand (ML); brown (7.5YR 4/4); damp; firm; low plasticity; 85% silt; 15% fine sand; subrounded to rounded; tuff sand; no odor. | | | |
| 145 | | | | | Silty SAND (SM); brown (7.5YR 4/4); damp; dense; 55% fine sand; subrounded; 45% silt; no odor. | SM | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subrounded to rounded; 5% silt; abundant tuff; no odor. | | | |
| 155 | | | | | Same as above (150 ft). | | | Kelly down @ 1214. New 20' connection @ 1308. Resumed drilling @ 1310. |
| 160 | | | 0.0 | | Same as above (150 ft); 100% fine to coarse sand; rounded. | | | |
| 165 | | | | | Same as above (150 ft); 90% fine to coarse sand; 10% gravel; subrounded to rounded; no odor. Note: gravel is composed of basalt and tuff. | SW | Filter Pack | |
| 170 | | | | | Same as above (150 ft); brown (10YR 5/3); 95% fine to coarse sand; 5% gravel to 1cm; no odor. | | | |
| 175 | | | | | Same as above (150 ft); 100% fine to coarse sand; rounded; no odor. | | | Kelly down @ 1333. New 20' connection @ 1342. Resumed drilling @ 1342. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | 0.0 | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | SW | | |
| 185 | | | | | Same as above (180 ft); 95% sand; 5% gravel to 1cm. Note: gravel is composed of volcanic tuff. | | Filter Pack | |
| 190 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; rounded; no odor. | SP | | |
| 195 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 85% fine to coarse sand; subrounded; 15% fine gravel to 2cm; subrounded; no odor. Note: gravel is composed of basalt and tuff. | SW | | Kelly down @ 1356. New 5' connection @ 1405. Resumed drilling @ 1405. |
| 200 | | | 0.0 | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; rounded; no odor. | SP | Bottom of Screen<br>Bentonite Seal | Kelly down @ 1412. Total depth with 11-3/4" casing. End of 10/11/11. Resumed drilling with 9-5/8" casing @ 0810 on 10/12/11. |
| 205 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; rounded; 5% fine gravel to 1cm; subrounded; no odor. | SW | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | SILT (ML); yellowish brown (10YR 5/4); damp; firm; nonplastic; 100% silt; no odor. | ML | | |
| 215 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; dense; 95% fine to coarse sand; subrounded; 5% fine gravel; rounded; no odor. | SW | | Kelly down @ 0824. New 20' connection @ 0832. Resumed drilling @ 0832. |
| 220 | | | 0.0 | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 60% fine gravel to 3cm; subrounded; 40% fine to coarse sand; no odor. Note: gravel is composed of basalt. | GP | | |
| 225 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); dry; dense; 95% fine to coarse sand; 5% fine gravel; subrounded; no odor. | SW | Filter Pack | |
| 230 | | | | | Same as above (225 ft); 85% sand; 10% gravel; 5% silt and clay. | | | |
| 235 | | | | | Same as above (225 ft); 100% sand; trace gravel; no odor. | | | Kelly down @ 0837. New 20' connection @ 0843. Resumed drilling @ 0843. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND with Silt (SP-SM); brown (10YR 5/3); dry; dense; 90% fine sand; 10% silt; no odor. | SP-SM | | |
| 245 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 75% fine gravel; subrounded; 25% fine to coarse sand; no odor. Note: gravel is composed of basalt. | GP | | |
| 250 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% fine to coarse sand; subrounded; 10% gravel to 4cm; subrounded; no odor. | | | |
| 255 | | | | | Same as above (250 ft); 100% sand. | SW | Filter Pack | Kelly down @ 0847. New 20' connection @ 0855. Resumed drilling @ 0855. |
| 260 | | | | | Lean CLAY (CL); brown (7.5YR 4/3); damp; firm; medium to high plasticty; 100% clay; no odor. | CL | | |
| 265 | | | | | SILT (ML); light olive brown (2.5Y 5/3); damp; firm; nonplastic; 95% silt; 5% fine sand; no odor. | ML | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Elastic SILT (MH); olive brown (2.5Y 4/3); damp; firm; low to medium plasticity; 100% silt; no odor. | MH | | |
| 275 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to medium sand; subrounded; no odor. | SW | | Kelly down @ 0901. New 20' connection @ 0929. Resumed drilling @ 0930. |
| 280 | | | 0.4 | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 95% fine to medium sand; 5% silt; no odor. | SP | Filter Pack | |
| 285 | | | | | Same as above (280 ft); 100% fine to medium sand; trace silt and clay; no odor. | | | |
| 290 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subrounded; 5% fine gravel; subrounded; no odor. | SW | | |
| 295 | | | | | Poorly graded GRAVEL with Sand (GP); dark yellowish brown (10YR 4/6); damp; dense; 75% fine gravel; subrounded; 25% fine to coarse sand; rounded; no odor. Note: gravel is composed of basalt. | GP | | Kelly down @ 0937. New 20' connection @ 0947. Resumed drilling @ 0947. |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 16:10 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | 0.0 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% fine to coarse sand; subrounded; 10% fine gravel to 1cm; subangular to subrounded; no odor. | | | |
| 305 | | | | | Same as above (300 ft); 95% sand; 5% gravel. | SW | | |
| 310 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; dense; 95% fine to medium sand; rounded; 5% silt nodules; no odor. | SP | | |
| 315 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 80% fine to coarse sand; rounded; 20% fine gravel; subrounded; no odor. | | Filter Pack | Kelly down @ 0957. New 20' connection @ 1010. Resumed drilling @ 1010. |
| 320 | | | 0.0 | | Same as above (315 ft); 65% sand; 35% gravel; subrounded. | SW | | |
| 325 | | | | | Same as above (315 ft); olive brown (2.5Y 4/3); 85% sand; 15% gravel to 1.5cm. | | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 16:10 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subrounded to rounded; 5% fine gravel to 1.5cm; rounded; no odor. | SW | | |
| 335 | | | | | Same as above (330 ft); 100% fine to coarse sand; no odor. | | | Kelly down @ 1020. New 20' connection @ 1030. Resumed drilling @ 1030. |
| 340 | | | 0.0 | | Same as above (330 ft); trace gravel. | | Filter Pack | |
| 345 | | | | | Same as above (330 ft); 95% sand; 5% gravel to 1cm; subrounded. | | | |
| 350 | | | | | Same as above (330 ft). | | Bottom of Screen | |
| | | | | | | | Bentonite Seal | |
| 355 | | | | | Same as above (330 ft); 100% sand; trace gravel; no odor. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1042. New 20' connection @ 1052. Resumed drilling @ 1052. |
| 360 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 16:10 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | 0.0 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular; no odor. | | | |
| 365 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 75% fine to coarse sand; 20% fine gravel to 1cm; subrounded; 5% silt nodules; no odor. | | | |
| 370 | | | | | Same as above (365 ft); 55% fine to coarse sand; 45% fine gravel; rounded; no odor. Note: gravel is composed of basalt. | | | |
| 375 | | | | | Same as above (365 ft); 85% fine to coarse sand; 15% gravel to 1.5cm; subrounded; no odor. | SW | Filter Pack | Kelly down @ 1101. New 20' connection @ 1110. Resumed drilling @ 1110. |
| 380 | | | 0.0 | | Same as above (365 ft); 75% fine to coarse sand; 25% gravel to 2cm; subrounded. | | | |
| 385 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subrounded; 5% gravel to 1cm; no odor. | | | |
| 390 | | | | | | | | |

# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | | | | |
| | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; trace gravel; no odor. | SW | | |
| 395 | | | | | | | | |
| | | | | | Silty SAND with Gravel (SM); brown (10YR 4/3); damp; dense; 60% fine to coarse sand; 20% fine gravel; subangular to subrounded; 20% silt nodules; no odor. | SM | | Kelly down @ 1118. New 20' connection @ 1127. Resumed drilling @ 1127. |
| 400 | | | 0.0 | | | | | |
| | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; no odor. | | | |
| 405 | | | | | Same as above (400 ft); trace gravel 1.5cm; trace silt nodules. | | Filter Pack | |
| 410 | | | | | Same as above (400 ft). | SW | | |
| 415 | | | | | Same as above (400 ft). | | | Kelly down @ 1137. New 20' connection @ 1146. Resumed drilling @ 1146. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | 0.1 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; no odor. | | | |
| 425 | | | | | Same as above (420 ft); trace gravel to 1cm; subrounded. | | | |
| 430 | | | | | Same as above (420 ft). | | | |
| 435 | | | | | Same as above (420 ft); 95% fine to coarse sand; 5% fine gravel to 1.5cm; subrounded; trace silt nodules; no odor. | SW | Filter Pack | Kelly down @ 1159. New 20' connection @ 1420. Resumed drilling @ 1420. |
| 440 | | | 0.0 | | Same as above (420 ft); no odor. | | | |
| 445 | | | | | Same as above (420 ft); no odor. | | | |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | |
| | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 75% fine gravel to 2cm; subrounded; 25% fine to coarse sand; no odor. Note: gravel is composed of basalt. | GP | |
| 455 | | | | | | | | |
| | | | | | Well graded SAND with Silt (SW-SM); olive brown (2.5Y 4/3); 90% fine to coarse sand; rounded; 10% silt; slight odor. | SW-SM | | Kelly down @ 1431. New 20' connection @ 1443. Resumed drilling @ 1444. |
| 460 | | | 7.1 | | | | | |
| | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; slight odor. | SW | | |
| 465 | | | | | Same as above (460 ft); slight odor. | | Filter Pack | |
| 470 | | | | | Same as above (460 ft); trace gravel; moderate odor. | | | |
| 475 | | | | | Same as above (460 ft); 95% sand; 5% gravel; subrounded; moderate odor. | | | Kelly down @ 1451. New 20' connection @ 1504. Resumed drilling @ 1505. |
| 480 | | | | | | | | |

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# Borehole ID: KAFB-106153

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/11/2011
Date TD Reached: 10/12/2011
Date Completed: 10/25/2011

Ground Elevation AMSL (ft): 5348.7
Y Coordinate: 1473466.72
X Coordinate: 1542176.47

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock

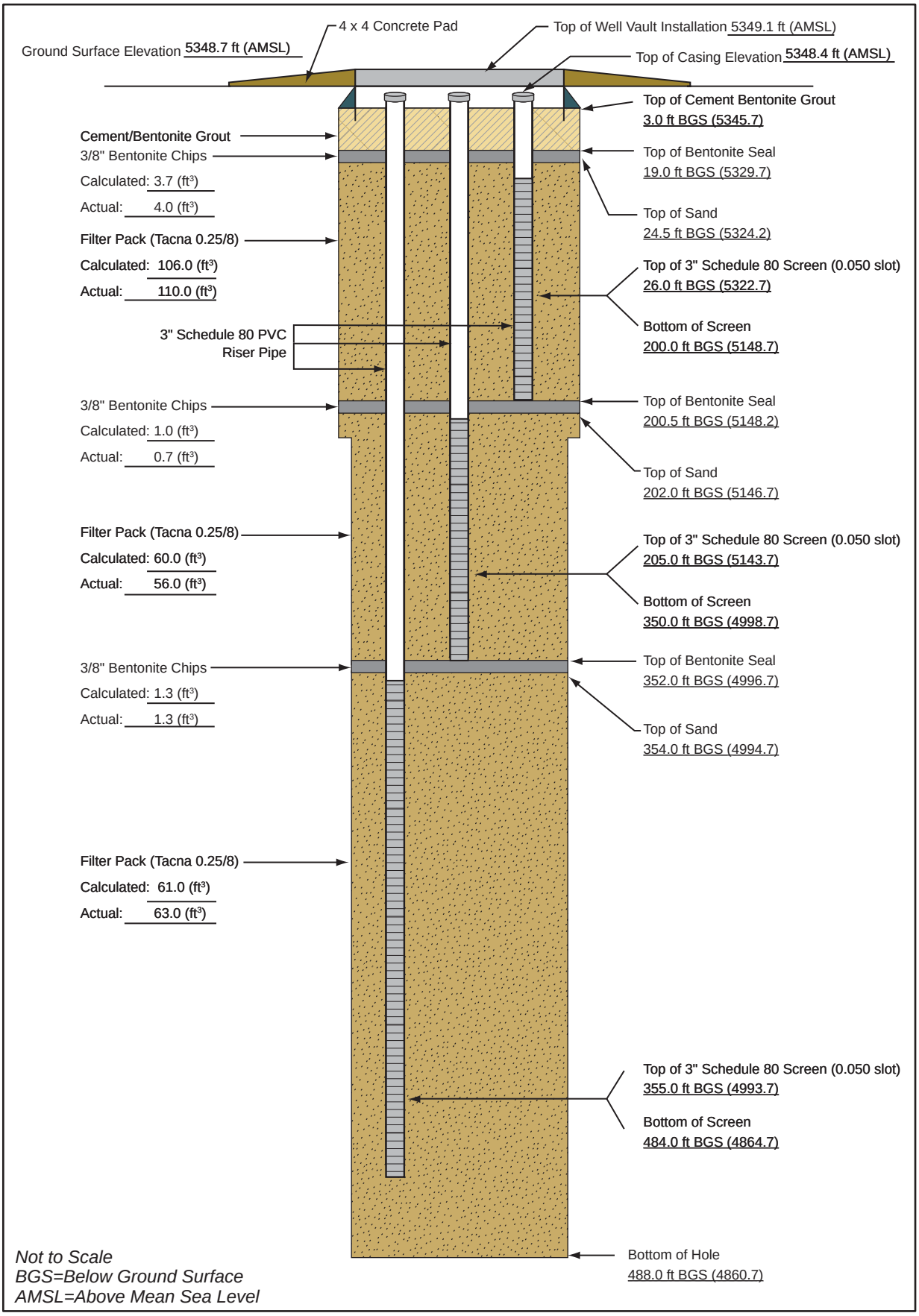


| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | | | | | | |
| | | | 128.0 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subangular to subrounded; 5% gravel; moderate to strong odor. | SW | Bottom of Screen | |
| 485 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 100% fine to medium sand; subrounded; trace coarse sand; moderate to strong odor. | SP | | |
| 490 | | | | | | | | Total depth = 488 ft. Reached @ 1510 on 10/12/11. |
| | | | | | | | | Water added during drilling (gallons) = 0 |
| | | | | | | | | Water added after drilling (gallons) = 0 |
| 495 | | | | | | | | |
| | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 500 | | | | | | | | PID measurements obtained from cuttings placed in a jar. |
| 505 | | | | | | | | |
| 510 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/4/11 16:10 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# PneuLog Well Completion Diagram KAFB-106153

Installation Start Date/Time: 10/21/2011@11:00
Installation End Date/Time: 10/25/2011@12:00




140705.EA010020_106153

# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 2.5 | | SILT (ML); brown (7.5YR 4/3); damp; firm; nonplastic; 100% silt; trace caliche nodules; no odor. | | | Hand augered. |
| 5 | | | | | Same as above (0 ft); brown (7.5YR 5/4). | | | Began drilling @ 0834 on 10/14/11. |
| 10 | | | | | Same as above (0 ft); brown (7.5YR 4/4); no caliche nodules; no odor. | ML | Cement Bentonite Grout | |
| 15 | | | | | Same as above (0 ft). | | | Kelly down @ 0842. New 20' connection and resumed drilling @ 0853. |
| 20 | | | 0.0 | | Elastic SILT (MH); strong brown (7.5YR 4/6); damp; firm; low to medium plasticity; 100% silt; trace gravel to 1cm; angular; no odor. Note: gravel is composed of granite. | MH | Bentonite Seal | |
| 25 | | | | | SILT (ML); brown (7.5YR 5/4); damp; firm; nonplastic; 100% silt; trace fine to coarse sand; no odor. | ML | Top of Filter Pack<br>Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/7/11 10:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); brown (7.5YR 4/4); damp; firm; nonplastic; 100% silt; no odor. | | | |
| 35 | | | | | Same as above (30 ft); strong brown (7.5YR 5/6). | | | Kelly down @ 0858. New 20' connection and resumed drilling @ 0905. |
| 40 | | | 0.0 | | Same as above (30 ft). | | | |
| 45 | | | | | Same as above (30 ft); brown (7.5YR 5/4); trace gravel to 1cm; angular. Note: gravel is composed of granite. | ML | Filter Pack | |
| 50 | | | | | Sandy SILT (ML); strong brown (7.5YR 5/6); damp; firm; non to low plasticity; 65% silt; 35% fine to coarse sand; angular; no odor. | | | |
| 55 | | | | | SILT (ML); strong brown (7.5YR 5/6); damp; firm; non to low plasticity; 100% silt; no odor. | | | Kelly down @ 0912. New 20' connection and resumed drilling @ 0919. |
| 60 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/7/11 10:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | 0.0 | | SILT (ML); strong brown (7.5YR 5/6); damp; firm; nonplastic; 95% silt; 5% fine to coarse sand; trace gravel; no odor. | | | |
| 65 | | | | | Same as above (60 ft); 100% silt; no odor. | | | |
| 70 | | | | | Same as above (60 ft); brown (7.5YR 4/3); low plasticity; 100% silt. | ML | | |
| 75 | | | | | Same as above (60 ft); trace gravel. | | Filter Pack | Kelly down @ 0934. New 20' connection and resumed drilling @ 0942. |
| 80 | | | 0.0 | | Same as above (60 ft); strong brown (7.5YR 5/6); nonplastic; 100% silt. | | | |
| 85 | | | | | Silty SAND (ML); yellowish brown (10YR 5/4); damp; dense; 70% fine to coarse sand; angular; 30% silt; no odor. | SM | | |
| 90 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/7/11 10:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); strong brown (7.5YR 4/6); dry; firm; nonplastic; 100% silt; trace caliche nodules; no odor. | | | |
| 95 | | | | | SILT (ML); brown (7.5YR 5/4); dry; firm; nonplastic; 95% silt; 5% fine sand; trace tuff; no odor. | ML | | Approximate top of Santa Fe Group. Kelly down @ 0949. New 20' connection and resumed drilling @ 0956. |
| 100 | | | 0.0 | | Same as above (95 ft); trace gravel; subrounded; no odor. | | | |
| 105 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded to rounded; no odor. | SW | Filter Pack | |
| 110 | | | | | SILT with Sand (ML); brown (10YR 4/3); dry; firm; nonplastic; 85% silt; 15% fine to coarse sand; angular to subangular; no odor. | | | |
| 115 | | | | | SILT (ML); brown (7.5YR 4/3); dry; firm; nonplastic; 100% silt; trace caliche nodules; no odor. | ML | | Kelly down @ 1002. New 20' connection and resumed drilling @ 1017. |
| 120 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/7/11 10:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | 0.0 | | SILT (ML); strong brown (7.5YR 4/6); dry; firm; nonplastic; 100% silt; no odor. | | | |
| 125 | | | | | Same as above (120 ft). | ML | | |
| 130 | | | | | Lean CLAY (CL); brown (7.5YR 4/3); damp; firm; medium to high plasticity; 100% clay; no odor. | CL | | |
| 135 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 100% fine to medium sand; subrounded; no odor. | SP | Filter Pack | Kelly down @ 1032. New 20' connection and resumed drilling @ 1038. |
| 140 | | | 0.0 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded to rounded; trace gravel; no odor. | SW | | |
| 145 | | | | | Elastic SILT (MH); strong brown (7.5YR 4/6); damp; firm; low to medium plasticity; 100% silt; trace coarse sand; no odor. | MH | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; rounded; no odor. | | | |
| 155 | | | | | Same as above (150 ft). | | | Kelly down @ 1047. New 20' connection and resumed drilling @ 1054. |
| 160 | | | 0.0 | | Same as above (150 ft); abundant tuff. | | | |
| 165 | | | | | Same as above (150 ft); trace gravel; subrounded. | SW | Filter Pack | |
| 170 | | | | | Same as above (150 ft). | | | |
| 175 | | | | | Same as above (150 ft). | | | Kelly down @ 1100. New 20' connection and resumed drilling @ 1107. |
| 180 | | | | | | | | |

# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | 0.0 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; trace fine gravel; abundant tuff; no odor. | | | |
| 185 | | | | | Same as above (180 ft). | | Filter Pack | |
| 190 | | | | | Same as above (180 ft). | SW | | |
| 195 | | | | | Same as above (180 ft). | | | Kelly down @ 1110. New 5' connection and resumed drilling @ 1126. |
| 200 | | | | | | | Bottom of Screen<br>Bentonite Seal | |
| | | | 0.0 | | SILT (ML); brown (7.5YR 4/3); nonplastic; 90% silt; 10% gravel to 2cm; subrounded; no odor. | ML | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1131. End of 10/14/11. Total depth with 11-3/4" casing. Resumed drilling with 9-5/8" casing @ 1035 on 10/17/11. |
| 205 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% fine to coarse sand; rounded; 10% fine gravel; subrounded; no odor. | SW | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 60% fine to coarse sand; subrounded; 40% fine gravel; subrounded; no odor. | | | |
| 215 | | | | | Same as above (210 ft). | | | Kelly down @ 1040. New 20' connection @ 1049. Resumed drilling @ 1050. |
| 220 | | | 0.0 | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 90% fine to coarse sand; 10% fine gravel to 2.5cm; subrounded; no odor. | SW | | |
| 225 | | | | | Same as above (220 ft). | | Filter Pack | |
| 230 | | | | | Same as above (220 ft); 100% sand; trace gravel; abundant tuff. | | | |
| 235 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; subrounded; no odor. | SP | | Kelly down @ 1053. New 20' connection and resumed drilling @ 1100. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 95% fine to coarse sand; subrounded; 5% fine gravel; no odor. | SW | | |
| 245 | | | | | Same as above (240 ft). | | | |
| 250 | | | | | SILT (ML); light olive brown (2.5Y 5/3); damp; firm; low plasticity; 100% silt; no odor. | | | |
| 255 | | | | | Same as above (247 ft); olive yellow (2.5Y 6/6); nonplastic. | ML | Filter Pack | Kelly down @ 1106. New 20' connection and resumed drilling @ 1113. |
| 260 | | | 23.5 | | Same as above (247 ft). | | | |
| 265 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subrounded; 5% gravel; no odor. | SW | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 100% fine to medium sand; no odor. | | | |
| 275 | | | | | Same as above (270 ft); trace coarse sand. | SP | | Kelly down @ 1120. New 20' connection and resumed drilling @ 1127. |
| 280 | | | 721.0 | | Lean CLAY (CL); dark yellowish brown (10YR 4/4); damp; dense; medium to high plasticity; 100% clay; no odor. | CL | | |
| 285 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; dense; 100% fine to medium sand; no odor. | | Filter Pack | |
| 290 | | | | | Same as above (285 ft). | SP | | |
| 295 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% fine to coarse sand; subrounded; 10% fine gravel; subrounded; no odor. | SW | | Kelly down @ 1132. New 20' connection and resumed drilling @ 1139. |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | 1.3 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% fine to coarse sand; 10% gravel to 3cm; no odor. | | | |
| 305 | | | | | Same as above (300 ft). | | | |
| 310 | | | | | Same as above (300 ft). | | | |
| 315 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 55% fine to coarse sand; 45% gravel to 3cm; subrounded; no odor. Note: gravel is composed of basalt. | SW | Filter Pack | Kelly down @ 1142. New 20' connection and resumed drilling @ 1150. |
| 320 | | | 1.7 | | Same as above (315 ft); 70% fine to coarse sand; 30% gravel. | | | |
| 325 | | | | | Same as above (315 ft); 85% fine to coarse sand; 15% gravel to 3cm; subrounded. | | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 85% sand; 15% fine gravel; rounded; no odor. | | | |
| 335 | | | | | Same as above (330 ft). | SW | | Kelly down @ 1154. New 20' connection and resumed drilling @ 1309. |
| 340 | | | 3.5 | | SILT (ML); brown (7.5YR 4/3); damp; firm; low plasticity; 100% silt; no odor. | ML | Filter Pack | |
| 345 | | | | | Well graded SAND with Silt (SW-SM); light olive brown (2.5Y 5/3); 90% fine to coarse sand; subrounded; 10% silt; no odor. | | | |
| 350 | | | | | Same as above (345 ft); yellowish brown (10YR 5/4). | SW-SM | Bottom of Screen<br>Bentonite Seal | |
| 355 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; no odor. | SW | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1317. New 20' connection and resumed drilling @ 1341. |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | 0.7 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% fine to coarse sand; subrounded; 10% fine gravel; no odor. | SW | Filter Pack | Kelly down @ 1350. New 20' connection and resumed drilling @ 1355. |
| 365 | | | | | Same as above (360 ft); 95% fine to coarse sand; 5% gravel to 3cm. | | | |
| 370 | | | | | Same as above (360 ft); 90% fine to coarse sand; 10% gravel. | | | |
| 375 | | | | | Same as above (360 ft); 95% fine to coarse sand; 5% gravel; no odor. | | | |
| 380 | | | 1.8 | | Same as above (360 ft); 100% fine to coarse sand. | | | |
| 385 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 85% fine gravel to 4cm; rounded; 15% fine to coarse sand; no odor. Note: gravel is composed of basalt. | GP | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; 5% fine gravel; rounded; no odor. | | | |
| 395 | | | | | Same as above (390 ft); 90% fine to coarse sand; 10% gravel. | | | Kelly down @ 1400. New 20' connection and resumed drilling @ 1407. |
| 400 | | | 6.5 | | Same as above (390 ft). | | | |
| 405 | | | | | Same as above (390 ft); 100% fine to coarse sand; trace fine gravel. | SW | Filter Pack | |
| 410 | | | | | Same as above (390 ft). | | | |
| 415 | | | | | Same as above (390 ft); 100% fine to coarse sand; trace fine gravel. | | | Kelly down @ 1414. New 20' connection and resumed drilling @ 1421. |
| 420 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/7/11 10:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | 3.7 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular; no odor. | | | |
| 425 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 75% fine to coarse sand; subrounded; 25% gravel to 3cm; subrounded; no odor. Note: gravel is composed of basalt. | SW | | |
| 430 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 100% fine sand; trace silt and clay; no odor. | SP | | |
| 435 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | | Filter Pack | Kelly down @ 1428. New 20' connection @ 1512. Resumed drilling @ 1513. |
| 440 | | | 2.6 | | Same as above (435 ft). | SW | | |
| 445 | | | | | Elastic SILT (MH); brown (7.4YR 4/3); damp; firm; low to medium plasticity; 100% silt; slight odor. | MH | | |
| 450 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/7/11 10:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 95% fine to coarse sand; 5% gravel to 2cm; subrounded; slight odor. | SW | | |
| 455 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; dense; 100% fine to medium sand; trace silt and clay; slight odor. | SP | | Kelly down @ 1522. New 20' connection and resumed drilling @ 1528. |
| 460 | | | 126.0 | | Well graded SAND (SW); brown (10YR 4/3); damp; dense; 100% fine to coarse sand; subrounded; slight odor. | | | |
| 465 | | | | | Same as above (460 ft); trace gravel; strong odor. | | Filter Pack | |
| 470 | | | | | Same as above (460 ft); 90% fine to coarse sand; 10% fine gravel; subrounded; strong odor. | SW | | |
| 475 | | | | | Same as above (460 ft); 95% fine to coarse sand; 5% gravel; strong to moderate odor. | | | Kelly down @ 1542. New 20' connection and resumed drilling @ 1555. |
| 480 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/7/11 10:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106154

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/14/2011
Date TD Reached: 10/17/2011
Date Completed: 10/20/2011

Ground Elevation AMSL (ft): 5347.2
Y Coordinate: 1473515.14
X Coordinate: 1541867.52

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock

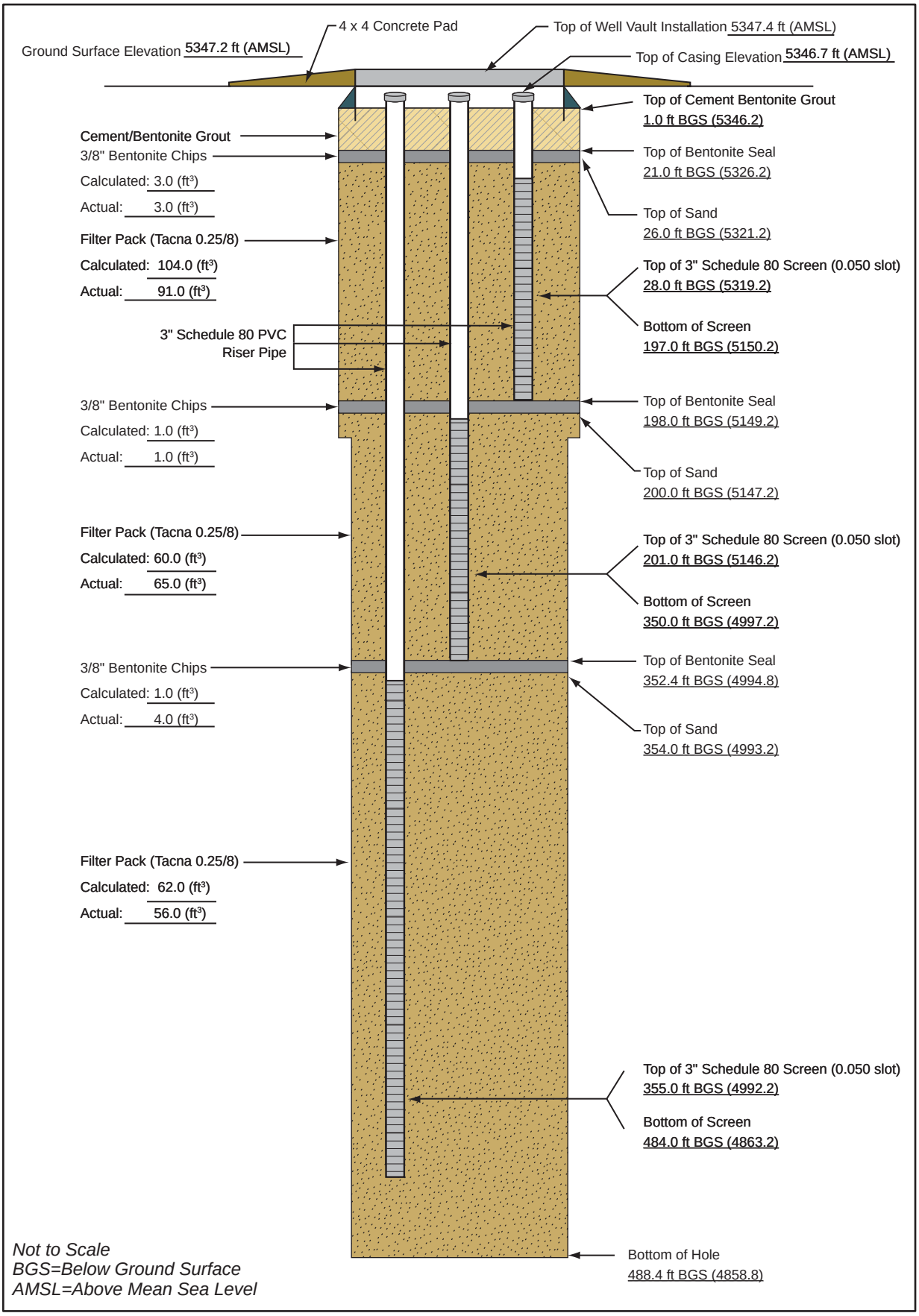


| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | | | | | | |
| | | | 196.0 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subrounded; 5% gravel; strong odor. | SW | | |
| 485 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); damp; dense; 95% fine to medium sand; trace coarse sand; trace gravel; 5% silt and clay; strong odor. | SP | Bottom of Screen | |
| 490 | | | | | | | | Total depth = 488.4 ft. Reached @ 1601 on 10/17/11. |
| | | | | | | | | Water added during drilling (gallons) = 0 |
| 495 | | | | | | | | Water added after drilling (gallons) = 0 |
| | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 500 | | | | | | | | PID measurements obtained from cuttings placed in a jar. |
| 505 | | | | | | | | |
| 510 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 11/7/11 10:58 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# PneuLog Well Completion Diagram KAFB-106154

Installation Start Date/Time: 10/18/2011@08:00
Installation End Date/Time: 10/20/2011@12:00




140705.EA010020_106154

# Borehole ID: KAFB-106155

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 1.5 | | SILT (ML); brown (7.5YR 5/3); damp; firm; nonplastic; 90% silt; 10% fine to coarse sand; angular; no odor. | | | Hand augered. |
| 5 | | | | | Same as above (0 ft); light brown (7.5YR 6/3); caliche. | ML | | Began drilling @ 1315 on 10/26/11. |
| 10 | | | | | Same as above (0 ft); 95% silt; 5% sand and gravel to 1.5cm; trace caliche. | | Cement Bentonite Grout | |
| 15 | | | | | Lean CLAY (CL); strong brown (7.5YR 4/6); damp; firm; medium to high plasticity; 100% clay; no odor. | CL | Bentonite Seal | Kelly down @ 1326. New 20' connection and resumed drilling @ 1332. |
| 20 | | | 0.0 | | SILT (ML); brown (7.5YR 5/4); damp; firm; non to low plasticity; 100% silt; trace coarse sand; no odor. | | Top of Filter Pack | |
| 25 | | | | | Same as above (20 ft); brown (7.5YR 4/4). | ML | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 12/20/11 09:54 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106155

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); brown (7.5YR 4/4); damp; firm; low plasticity; 100% silt; no odor. | | | |
| 35 | | | | | Same as above (30 ft); strong brown (7.5YR 5/6); nonplastic. | | | Kelly down @ 1337. New 20' connection and resumed drilling @ 1344. |
| 40 | | | 0.0 | | SILT with Gravel (ML); brown (7.5YR 5/4); dry; firm; nonplastic; 75% silt; 25% fine to coarse gravel; angular; no odor. Note: gravel is composed of granite. | | | |
| 45 | | | | | SILT (ML); brown (7.5YR 4/4); damp; firm; low plasticity; 100% silt; no odor. | ML | Filter Pack | |
| 50 | | | | | Same as above (45 ft); brown (7.5YR 5/4); nonplastic; 90% silt; 10% fine gravel; subrounded; no odor. | | | |
| 55 | | | | | Same as above (45 ft); non to low plasticity; 95% silt; 5% gravel; angular; no odor. | | | Kelly down @ 1355. New 20' connection and resumed drilling @ 1359. |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106155

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | 0.0 | | SILT (ML); brown (7.5YR 4/4); dry; firm; nonplastic; 95% silt; 5% gravel to 1cm; angular; no odor. Note: gravel is composed of granite. | ML | Filter Pack | Kelly down @ 1408. New 20' connection and resumed drilling @ 1422. |
| 65 | | | | | Same as above (60 ft); 100% silt; no odor. | | | |
| 70 | | | | | SILT with Sand (ML); light brown (7.5YR 6/4); dry; firm; nonplastic; 75% silt; 25% sand; angular; no odor. | | | |
| 75 | | | | | SILT (ML); brown (7.5YR 5/4); dry; firm; nonplastic; 100% silt; trace gravel; angular; no odor. Note: gravel is composed of dolomite. | | | |
| 80 | | | 0.0 | | Same as above (75 ft); brown (7.5YR 4/4); low plasticity. | | | |
| 85 | | | | | Same as above (75 ft); nonplastic; 95% silt; 5% fine to coarse sand; angular; no odor. | | | |
| 90 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 12/20/11 09:54 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106155

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); strong brown (7.5YR 5/6); dry; firm; nonplastic; 95% silt; 5% fine to coarse sand; angular; no odor. | ML | | |
| 95 | | | | | Silty SAND (SM); brown (7.5YR 5/4); dry; dense; 65% fine sand; subangular to subrounded; 35% silt; no odor. | SM | | Approximate top of Santa Fe Group. Kelly down @ 1429. New 20' connection and resumed drilling @ 1438. |
| 100 | | | 0.0 | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); dry; dense; 95% fine to medium sand; subrounded; 5% gravel; no odor. | SP | | |
| 105 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular; abundant tuff; no odor. | SW | Filter Pack | |
| 110 | | | | | SILT (ML); brown (7.5YR 5/4); dry; firm; nonplastic; 100% silt; no odor. | ML | | |
| 115 | | | | | Same as above (110 ft); trace clay nodules; no odor. | | | Kelly down @ 1443. New 20' connection @ 1448. Resumed drilling @ 1449. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106155

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT (ML); brown (7.5YR 5/4); damp; firm; non to low plasticity; 100% silt; trace sand; no odor. | | | |
| 125 | | | | | Same as above (120 ft); yellowish brown (10YR 5/4); no sand. | ML | | |
| 130 | | | | | Elastic SILT (MH); dark yellowish brown (10YR 4/4); damp; firm; low to medium plasticity; 100% silt; no odor. | MH | | |
| 135 | | | | | No cuttings returned. | | Filter Pack | Kelly down @ 1505. New 20' connection @ 1524. Resumed drilling @ 1525. |
| 140 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 95% fine to medium sand; 5% silt and clay; no odor. | SP | | |
| 145 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | SW | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106155

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | | | | |
| | | | | | Elastic SILT with Sand (MH); brown (7.5YR 4/4); damp; firm; low to medium plasticity; 80% silt; 20% fine to coarse sand; no odor. | MH | | |
| 155 | | | | | | | | |
| | | | | | Sandy SILT (ML); brown (7.5YR 5/4); dry; nonplastic; 65% silt; trace clay nodules; 35% fine sand; no odor. | ML | | Kelly down @ 1536. New 20' connection and resumed drilling @ 1544. |
| 160 | | | 0.0 | | | | | |
| | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subrounded; 5% gravel; no odor. | SW | | |
| 165 | | | | | Same as above (160 ft). | | Filter Pack | |
| 170 | | | | | Same as above (160 ft); brown (10YR 5/3); abundant tuff. | | | |
| 175 | | | | | Same as above (160 ft). | | | Kelly down @ 1554. New 20' connection and resumed drilling @ 1604. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106155

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | 0.0 | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 95% fine to coarse sand; subrounded; 5% gravel; abundant tuff; no odor. | SW | | |
| 185 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; rounded; trace coarse sand; no odor. | SP | Filter Pack | |
| 190 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; rounded; trace gravel; no odor. | SW | | |
| 195 | | | | | Same as above (190 ft). | | | Kelly down @ 1615. New 5' connection and resumed drilling @ 1621. |
| 200 | | | 0.0 | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; rounded; trace coarse sand; trace silt and clay; no odor. | SP | Bottom of Screen<br>Bentonite Seal | Kelly down @ 1625. Total depth with 11-3/4" casing. End of 10/26/11. New 20' connection @ 1052 on 10/27/11. Resumed drilling with 9-5/8" casing @ 1056. |
| 205 | | | | | Same as above (200 ft). | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 210 | | | | | | | | |

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**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; trace coarse sand; no odor. | SP | | |
| 215 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; trace gravel; no odor. | SW | | Kelly down @ 1101. New 20' connection and resumed drilling @ 1107. |
| 220 | | | 0.0 | | Same as above (215 ft); 95% sand; 5% gravel to 3cm; subrounded to rounded; no odor. | | | |
| 225 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; rounded; no odor. | SP | Filter Pack | |
| 230 | | | | | Same as above (225 ft); trace coarse sand. | | | |
| 235 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; rounded; no odor. | SW | | Kelly down @ 1110. New 20' connection and resumed drilling @ 1118. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106155

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | 0.0 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded to rounded; trace gravel; no odor. | | | |
| 245 | | | | | Same as above (240 ft); 95% sand; 5% gravel. | SW | | Gravel lense ~1 ft thick. |
| 250 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded to rounded; trace gravel; no odor. | | | |
| 255 | | | | | SILT (ML); olive brown (2.5Y 4/3); damp; firm; non to low plasticity; 100% silt; no odor. | | Filter Pack | Kelly down @ 1122. New 20' connection and resumed drilling @ 1130. |
| 260 | | | 11.1 | | Same as above (254 ft); low plasticity. | ML | | |
| 265 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; rounded; no odor. | SP | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106155

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND with Silt (SP-SM); dark yellowish brown (10YR 4/4); damp; dense; 90% fine sand; 10% silt; no odor. | SP-SM | | |
| 275 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 95% fine to medium sand; subrounded; 5% silt; no odor. | SP | | Kelly down @ 1135. New 20' connection and resumed drilling @ 1145. |
| 280 | | | 0.6 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | SW | | |
| 285 | | | | | Sandy SILT (ML); olive brown (2.5Y 4/4); damp; firm; low plasticity; 70% silt; 30% fine to medium sand; no odor. | ML | Filter Pack | |
| 290 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 85% fine to coarse sand; subrounded; 15% fine gravel to 2cm; subrounded; no odor. | SW | | |
| 295 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | | | Kelly down @ 1157. New 20' connection and resumed drilling @ 1300. |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 12/20/11 09:54 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106155

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | 0.0 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; no odor. | SW | | |
| 305 | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 70% fine gravel to 2cm; subrounded; 30% fine to coarse sand; no odor. Note: gravel is composed of basalt. | GP | | |
| 310 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); dry; dense; 95% fine to coarse sand; 5% gravel; no odor. | | | |
| 315 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 75% fine to coarse sand; 25% gravel to 3cm; subrounded; no odor. | | Filter Pack | Kelly down @ 1309. New 20' connection and resumed drilling @ 1318. |
| 320 | | | 0.0 | | Same as above (315 ft); 65% sand; 35% gravel to 5cm. | SW | | |
| 325 | | | | | Same as above (315 ft); 80% sand; 20% gravel to 2cm. | | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 12/20/11 09:54 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106155

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | | | | |
| | | | | | Poorly graded GRAVEL with Sand (GP); brown (10YR 4/3); dry; dense; 60% gravel to 3cm; subrounded; 40% fine to coarse sand; no odor. Note: gravel is composed of basalt. | GP | |
| 335 | | | | | | | | |
| | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 85% fine to coarse sand; subrounded; 15% gravel; subrounded; no odor. | | | Kelly down @ 1344. New 20' connection and resumed drilling @ 1352. |
| 340 | | | 0.1 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; no odor. | SW | Filter Pack | |
| 345 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 70% fine to coarse sand; subrounded; 30% gravel to 2cm; subrounded; no odor. | | | |
| 350 | | | | | | | Bottom of Screen | |
| | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 95% fine to medium sand; trace coarse sand; 5% gravel; no odor. | | Bentonite Seal | |
| 355 | | | | | Same as above (350 ft). | SP | Top of 3" Schedule 80 PVC 0.050 Slot Screen | Kelly down @ 1401. New 20' connection and resumed drilling @ 1407. |
| 360 | | | | | | | | |

# Borehole ID: KAFB-106155

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | 0.1 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | | | |
| 365 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 85% fine to coarse sand; 15% fine gravel; no odor. | | | |
| 370 | | | | | Same as above (365 ft); damp; 60% sand; subrounded; 40% gravel to 3cm; subrounded; no odor. | SW | | |
| 375 | | | | | Same as above (365 ft); 80% sand; 20% gravel to 1.5cm. | | Filter Pack | Kelly down @ 1416. New 20' connection and resumed drilling @ 1423. |
| 380 | | | 0.0 | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; no odor. | | | |
| 385 | | | | | Same as above (380 ft). | SP | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106155

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; dense; 100% fine to medium sand; trace coarse sand; trace gravel; no odor. | SP | | |
| 395 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 65% fine to coarse sand; subrounded; 35% gravel to 2cm; subrounded; no odor. | | | Kelly down @ 1434. New 20' connection and resumed drilling @ 1441. |
| 400 | | | 0.4 | | Well graded SAND (SW); yellowish brown (10YR 5/4); dry; dense; 100% fine to coarse sand; no odor. | | | |
| 405 | | | | | Same as above (400 ft); brown (10YR 4/3). | SW | Filter Pack | |
| 410 | | | | | Same as above (400 ft). | | | |
| 415 | | | | | Same as above (400 ft). | | | Kelly down @ 1456. New 20' connection and resumed drilling @ 1505. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106155

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | 1.6 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | | | |
| 425 | | | | | Same as above (420 ft); trace gravel to 0.5cm. | | | |
| 430 | | | | | Same as above (420 ft); 95% sand; 5% gravel; subrounded. | | | |
| 435 | | | | | Same as above (420 ft); 100% sand; trace gravel to 2cm; no odor. | SW | Filter Pack | Kelly down @ 1515. New 20' connection and resumed drilling @ 1521. |
| 440 | | | 0.8 | | Same as above (420 ft). | | | |
| 445 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 70% fine to coarse sand; 30% fine gravel; subrounded; no odor. | | | |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106155

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | | | | |
| | | | | | SILT (ML); yellowish brown (10YR 5/4); damp; firm; low plasticity; 95% silt; 5% gravel to 3cm; subrounded; slight odor. | ML | | |
| 455 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 95% fine to medium sand; 5% silt and clay; slight odor. | SP | | Kelly down @ 1533. New 20' connection and resumed drilling @ 1540. |
| 460 | | | 15.8 | | Same as above (455 ft); slight odor. | | | |
| 465 | | | | | | | Filter Pack | |
| | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; moderate odor. | SW | | |
| 470 | | | | | | | | |
| | | | | | Sandy SILT with Gravel (ML); yellowish brown (10YR 5/4); damp; firm; low plasticity; 55% silt; 30% fine to coarse sand; 15% gravel to 2cm; moderate odor. | ML | | |
| 475 | | | | | | | | |
| | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); damp; dense; 85% fine to coarse sand; rounded; 15% gravel to 2cm; subrounded; moderate to strong odor. | SW | | Kelly down @ 1554. New 20' connection and resumed drilling @ 1604. |
| 480 | | | | | | | | |

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# Borehole ID: KAFB-106155

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 10/26/2011
Date TD Reached: 10/27/2011
Date Completed: 11/1/2011

Ground Elevation AMSL (ft): 5346.9
Y Coordinate: 1473177.27
X Coordinate: 1542116.08

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | 53.9 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subrounded; 5% fine gravel; subrounded; moderate to strong odor. | SW | Bottom of Screen | |
| 485 | | | | | Same as above (480 ft). | | | |
| 490 | | | | | | | | Total depth = 488 ft. Reached @ 1615 on 10/27/11. |
| | | | | | | | | Water added during drilling (gallons) = 0 |
| 495 | | | | | | | | Water added after drilling (gallons) = 0 |
| | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 500 | | | | | | | | PID measurements obtained from cuttings placed in a jar. |
| 505 | | | | | | | | |
| 510 | | | | | | | | |

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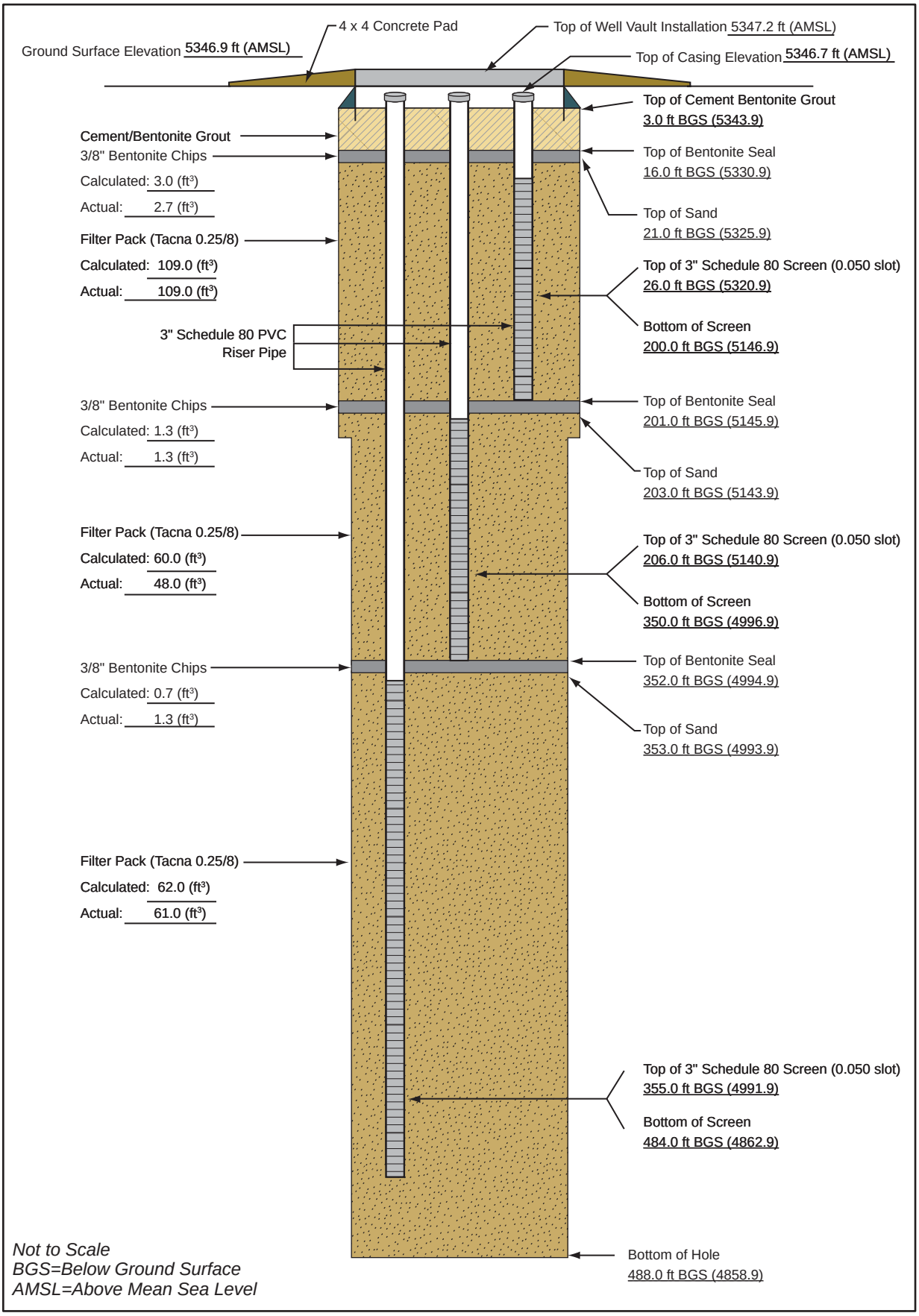
# PneuLog Well Completion Diagram KAFB-106155

Installation Start Date/Time: 10/28/2011@ 08:00
Installation End Date/Time: 11/01/2011@ 12:00




140705.EA010020_106155

# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 0.3 | | SILT (ML); brown (7.5YR 4/4); dry; soft; nonplastic; 95% silt; 5% sand; no odor. | | | Hand augered. |
| 5 | | | | | Same as above (0 ft); light brown (7.5YR 6/4); 100% silt; trace gravel. | | Cement Bentonite Grout | Began drilling @ 1025 on 11/2/11. |
| 10 | | | | | Same as above (0 ft); brown (7.5YR 5/4). | ML | | |
| 15 | | | | | Same as above (0 ft); light brown (7.5YR 6/4); trace caliche nodules. | | Bentonite Seal | Kelly down @ 1035. New 20' connection and resumed drilling @ 1046. |
| 20 | | | 0.0 | | Silty GRAVEL (GM); light brown (7.5YR 6/4); dry; dense; 60% gravel; angular; 40% silt; nonplastic; no odor. Note: gravel is composed of granite and limestone. | GM | Top of Filter Pack; Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 25 | | | | | SILT (ML); brown (7.5YR 5/4); dry; firm, nonplastic; 100% silt; no odor. | ML | | |
| 30 | | | | | | | | |

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# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | SILT (ML); light brown (7.5YR 6/4); dry; firm; nonplastic; 100% silt; trace fine sand; no odor. | | | |
| 35 | | | | | Same as above (30 ft); brown (7.5YR 4/4); low plasticity. | | | Kelly down @ 1055. New 20' connection and resumed drilling @ 1103. |
| 40 | | | 0.0 | | Same as above (30 ft); 95% silt; 5% sand; trace caliche nodules. | ML | | |
| 45 | | | | | Same as above (30 ft). | | Filter Pack | |
| 50 | | | | | Silty GRAVEL (GM); yellowish brown (10YR 5/4); dry; dense; 80% gravel; angular; 20% silt; no odor. Note: gravel is composed of granite. | GM | | |
| 55 | | | | | SILT (ML); brown (7.5YR 5/4); dry; firm; nonplastic; 90% silt; 10% sand and gravel; no odor. | ML | | Kelly down @ 1110. New 20' connection @ 1121. Resumed drilling @ 1124. |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | 0.0 | | Sandy SILT (ML); brown (7.5YR 5/4); dry; firm; nonplastic; 65% silt; 35% fine to coarse sand; angular; no odor. | | | |
| 65 | | | | | SILT (ML); brown (7.5YR 4/4); dry; firm; low plasticity; 100% silt; no odor. | | | |
| 70 | | | | | Same as above (65 ft); brown (7.5YR 5/4); non to low plasticity. | | | |
| 75 | | | | | Same as above (65 ft). | ML | Filter Pack | Kelly down @ 1130. New 20' connection and resumed drilling @ 1139. |
| 80 | | | 0.0 | | Same as above (65 ft). | | | |
| 85 | | | | | Same as above (65 ft); yellowish brown (10YR 5/4); nonplastic; 95% silt; 5% fine sand. | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); yellowish brown (10YR 5/4); damp; firm; nonplastic; 90% silt; 10% fine sand; trace tuff; no odor. | ML | | |
| 95 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 95% fine to coarse sand; subrounded; 5% silt and clay; trace gravel to 1cm; no odor. | SW | | Kelly down @ 1149. New 20' connection @ 1156. Resumed drilling @ 1250. |
| 100 | | | 0.5 | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 70% fine to coarse sand; subrounded; 30% gravel to 2cm; angular to subrounded; no odor. | | | |
| 105 | | | | | Elastic SILT (MH); strong brown (7.5YR 4/6); damp; firm; low to medium plasticity; 100% silt; no odor. | MH | Filter Pack | |
| 110 | | | | | SILT (ML); strong brown (7.5YR 5/6); damp; firm; non to low plasticity; 100% silt; no odor. | ML | | |
| 115 | | | | | Same as above (110 ft); nonplastic. | | | Kelly down @ 1301. New 20' connection and resumed drilling @ 1309. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | 0.1 | | SILT (ML); brown (10YR 5/4); damp; firm; low plasticity; 100% silt; no odor. | ML | | |
| 125 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 95% fine to medium sand; subrounded; trace coarse sand; 5% silt and clay; no odor. | SP | | |
| 130 | | | | | Same as above (125 ft). | | | |
| 135 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | SW | Filter Pack | Kelly down @ 1322. New 20' connection and resumed drilling @ 1330. |
| 140 | | | 0.2 | | SILT with Sand (ML); strong brown (7.5YR 5/4); damp; firm; nonplastic; 85% silt; 15% fine sand; trace gravel; no odor. | ML | | |
| 145 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. Note: abundant tuff. | SW | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subrounded to rounded; no odor. Note: abundant tuff. | | | |
| 155 | | | | | Same as above (150 ft). | | | Kelly down @ 1346. New 20' connection and resumed drilling @ 1353. |
| 160 | | | 0.3 | | Same as above (150 ft). | SW | | |
| 165 | | | | | Same as above (150 ft); 90% sand; 10% gravel to 1.5cm; subrounded to rounded; no odor. | | Filter Pack | |
| 170 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 95% fine to medium sand; 5% gravel to 2cm; subrounded; no odor. | SP | | |
| 175 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; no odor. | SW | Bottom of Screen<br>Bentonite Seal | Kelly down @ 1404. New 20' connection and resumed drilling @ 1419. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | 0.0 | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; no odor. | SW | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 185 | | | | | Same as above (180 ft); abundant tuff. | | | |
| 190 | | | | | Same as above (180 ft). | | | |
| 195 | | | | | Same as above (180 ft); trace gravel to 1cm. | | | Kelly down @ 1430. New 5' connection and resumed drilling @ 1440. |
| 200 | | | 0.3 | | Same as above (180 ft). | | | Total depth with 11-3/4" casing. End of 11/2/11. New 20' connection and resumed drilling with 9-5/8" casing @ 0832 on 11/3/11. |
| 205 | | | | | Same as above (180 ft); 95% fine to coarse sand; 5% gravel to 1cm. | | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subrounded; 5% fine gravel to 1cm; no odor. | | | |
| 215 | | | | | Same as above (210 ft); brown (10YR 5/3); 100% sand; trace gravel. | SW | | Kelly down @ 0838. New 20' connection and resumed drilling @ 0848. |
| 220 | | | 0.3 | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; trace coarse sand; trace gravel; no odor. | SP | | |
| 225 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | | Filter Pack | |
| 230 | | | | | Same as above (225 ft); trace gravel. | SW | | |
| 235 | | | | | Same as above (225 ft). | | | Kelly down @ 0853. New 20' connection and resumed drilling @ 0900. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | 0.4 | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 80% fine to coarse sand; rounded; 20% gravel to 2cm; subrounded; no odor. | | | |
| 245 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; no odor. | SW | | |
| 250 | | | | | Same as above (245 ft). | | | |
| 255 | | | | | SILT (ML); brown (7.5YR 5/4); damp; firm; low plasticity; 100% silt; no odor. | | Filter Pack | Kelly down @ 0905. New 20' connection and resumed drilling @ 0912. |
| 260 | | | 4.2 | | Same as above (254 ft); 90% silt; 10% fine to coarse sand; no odor. | ML | | |
| 265 | | | | | Same as above (254 ft); 95% silt; 5% fine sand. | | | |
| 270 | | | | | | | | |

# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | SILT (ML); brown (7.5YR 5/4); damp; firm; low plasticity; 100% silt; no odor. | ML | | |
| 275 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; no odor. | | | Kelly down @ 0920. New 20' connection and resumed drilling @ 0927. |
| 280 | | | 2.0 | | Same as above (273 ft); trace gravel. | | | |
| 285 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 80% fine to coarse sand; 20% gravel to 3cm; no odor. | SW | Filter Pack | |
| 290 | | | | | Same as above (285 ft). | | | |
| 295 | | | | | Same as above (285 ft). | | | Kelly down @ 0936. New 20' connection and resumed drilling @ 0943. |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | 0.3 | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 85% fine to coarse sand; 15% gravel to 3cm; subrounded. | SW | | |
| 305 | | | | | Poorly graded GRAVEL (GP); brown (10YR 4/3); dry; dense; 90% gravel to 4cm; 10% fine to coarse sand; no odor. Note: gravel is composed of basalt and quartzite. | GP | | |
| 310 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subrounded; 5% gravel to 4cm; no odor. | | | |
| 315 | | | | | Same as above (310 ft); gravel to 2cm. | | Filter Pack | Kelly down @ 0952. New 20' connection and resumed drilling @ 0959. |
| 320 | | | 0.2 | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 70% fine to coarse sand; subrounded; 30% gravel to 4cm; subrounded; no odor. | SW | | |
| 325 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% fine to coarse sand; subrounded to rounded; 10% gravel to 2cm; no odor. | | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subrounded; trace gravel to 1cm; no odor. | SW | | |
| 335 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; no odor. | SP | Filter Pack | Kelly down @ 1008. New 20' connection and resumed drilling @ 1017. |
| 340 | | | 0.0 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; subrounded; 5% gravel to 2cm; no odor. | | Bottom of Screen<br>Bentonite Seal | |
| 345 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 80% fine to coarse sand; subrounded; 20% gravel to 3cm; subrounded; no odor. | | Top of 3" Schedule 80 PVC 0.050 Slot Screen | |
| 350 | | | | | Same as above (345 ft); 60% sand; 40% gravel to 3cm. | SW | | |
| 355 | | | | | Same as above (345 ft); 70% sand; 30% gravel to 2cm. Note: gravel is composed of basalt. | | | Kelly down @ 1026. New 20' connection and resumed drilling @ 1033. |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | 0.0 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular; no odor. | | | |
| 365 | | | | | Same as above (360 ft); 95% fine to coarse sand; subrounded; 5% gravel to 2cm; subrounded; no odor. | | | |
| 370 | | | | | Same as above (360); gravel to 1cm. | SW | | |
| 375 | | | | | Same as above (360 ft). | | Filter Pack | Kelly down @ 1042. New 20' connection and resumed drilling @ 1047. |
| 380 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; dense; 100% fine to medium sand; trace coarse sand; no odor. | SP | | |
| 385 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% sand; subangular to subrounded; no odor. | SW | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 90% fine to coarse sand; subrounded; 10% gravel; no odor. | SW | | |
| | | | | | SILT (ML); lense. | ML | | |
| 395 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subrounded; trace silt and clay; no odor. | | | Kelly down @ 1059. New 20' connection @ 1105. Resumed drilling @ 1106. |
| 400 | | | 1.0 | | Same as above (394 ft); 95% sand; 5% silt and clay; no odor. | | | |
| 405 | | | | | Same as above (394 ft). | SW | Filter Pack | |
| 410 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 80% fine to coarse sand; subrounded; 15% gravel to 1cm; subangular; 5% silt nodules; no odor. | | | |
| 415 | | | | | Well graded SAND with Silt (SW-SM); brown (7.5YR 5/4); dry; dense; 90% fine to coarse sand; subrounded; 10% silt; trace gravel to 1cm; no odor. | SW-SM | | Kelly down @ 1113. New 20' connection and resumed drilling @ 1119. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | | | | |
| | | | 0.8 | | SILT (ML); brown (7.5YR 5/4); damp; firm; nonplastic; 100% silt; trace fine sand; no odor. | ML | | |
| 425 | | | | | Poorly graded SAND with Silt (SP-SM); brown (7.5YR 5/4); damp; dense; 90% fine to medium sand; 10% silt; no odor. | SP-SM | | |
| 430 | | | | | Same as above (425 ft). | | | |
| 435 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; dense; 95% fine to medium sand; trace coarse sand; 5% silt and clay; no odor. | SP | Filter Pack | Kelly down @ 1127. New 20' connection and resumed drilling @ 1133. |
| 440 | | | 1.6 | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; dense; 90% fine to coarse sand; 10% gravel; no odor. | SW | | |
| 445 | | | | | Same as above (440 ft); 95% sand; 5% gravel. | | | |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; 5% gravel; no odor. | | | Bit chatter and slow advancement for ~0.4'. |
| 455 | | | | | Same as above (450 ft); 100% sand; no odor. | SW | | Kelly down @ 1145. New 20' connection and resumed drilling @ 1150. |
| 460 | | | 0.1 | | Same as above (450 ft). | | | |
| 465 | | | | | SILT (ML); lense. | ML | Filter Pack | |
| 470 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 95% fine to coarse sand; 5% gravel; no odor. | | | |
| 475 | | | | | Well graded SAND with Gravel (SW); brown (10YR 4/3); dry; dense; 80% fine to coarse sand; subrounded; 20% gravel to 1cm; subrounded; no odor. | SW | | |
| 480 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% fine to coarse sand; subrounded; trace gravel; no odor. | | | Kelly down @ 1200. New 20' connection and resumed drilling @ 1208. |

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# Borehole ID: KAFB-106156

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 11/2/2011
Date TD Reached: 11/3/2011
Date Completed: 11/9/2011

Ground Elevation AMSL (ft): 5340.9
Y Coordinate: 1473297.18
X Coordinate: 1541298.57

Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.): 9-5/8
Surface Completion Type: Flush mount

Groundwater Levels BGS (ft):
At Time of Drilling: N/A
At End of Drilling: N/A
After Drilling: N/A

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Greg Peacock



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | 0.2 | | Well graded SAND (SW); brown (10YR 4/3); dry; dense; 100% fine to coarse sand; subangular to subrounded; no odor. | SW | Bottom of Screen | |
| 485 | | | | | Same as above (480 ft); no odor. | | Native Backfill | |
| 490 | | | | | | | | Total depth = 488 ft. Reached @ 1212 on 11/3/11. |
| | | | | | | | | Water added during drilling (gallons) = 0 |
| 495 | | | | | | | | Water added after drilling (gallons) = 0 |
| | | | | | | | | Kelly down: TD the joint and ready to make new connection. |
| 500 | | | | | | | | PID measurements obtained from cuttings placed in a jar. |
| 505 | | | | | | | | |
| 510 | | | | | | | | |

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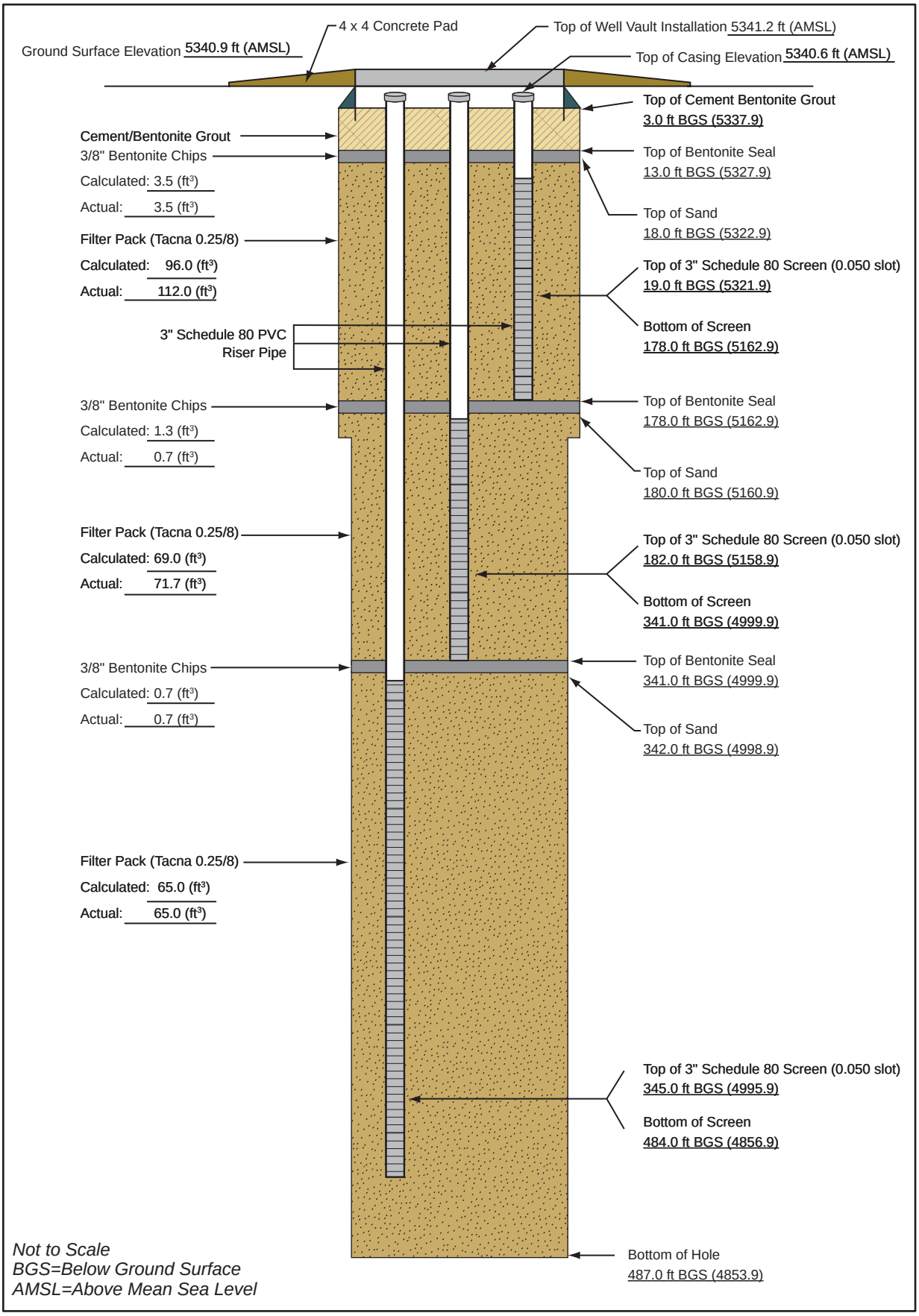
# PneuLog Well Completion Diagram KAFB-106156

Installation Start Date/Time: 11/04/2011@ 08:00
Installation End Date/Time: 11/09/2011@ 12:00




140705.EA010020_106156

# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | No description recorded. | | Cement | Hand augered. |
| 5 | | | | | No description recorded. | | Top of Cement Grout | Began drilling @ 1405 on 2/23/12. |
| 10 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; very loose; 65% very fine to medium sand; 5% coarse to very coarse sand; 10% gravel to 10mm; angular to rounded; 20% silt. | SM | | Larger clasts are caliche coated. |
| 15 | | | | | Silty SAND (SM); red (2.5YR 4/8); moist; very loose; 67% very fine to medium sand; 3% coarse sand; 5% gravel to 12mm; angular to subrounded; 20% silt; 5% clay. | | | New 20' connection @ 1418. Resumed drilling @ 1427. |
| 20 | | | | | Silty SAND (SM); red (2.5YR 4/6); dry; very loose; 66% very fine to medium sand; 3% coarse to very coarse sand; 1% gravel to 8mm; angular to subrounded; 30% silt. | | | |
| 25 | | | | | Silty SAND (SM); red (2.5YR 4/8); moist; very loose; 65% very fine to medium sand; 5% coarse to very coarse sand; 30% silt. | | | |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/30/12 13:38 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Silty SAND (SM); red (2.5YR 4/8); moist; very loose; 70% very fine to medium sand; 30% silt. | | | |
| 35 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; very loose; 66% very fine to medium sand; 3% coarse to very coarse sand; 1% gravel to 8mm; subangular to subrounded; 30% silt. | | | New 20' connection @ 1438. Resumed drilling @ 1446. |
| 40 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; very loose; 64% very fine to medium sand; 5% coarse to very coarse sand; 1% gravel to 5mm; angular to subangular; 30% silt. | | | |
| 45 | | | | | Silty SAND (SM); red (2.5YR 4/8); moist; loose; 60% very fine to medium sand; 10% coarse to very coarse sand; 5% gravel to 15mm; subangular to subrounded; 25% silt. | SM | Cement Grout | |
| 50 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 64% very fine to medium sand; 10% coarse to very coarse sand; 1% gravel to 8mm; angular; 25% silt. | | | |
| 55 | | | | | Silty SAND (SM); yellowish red (5YR 4/6); moist; loose; 80% very fine to coarse sand; 5% very coarse sand; 15% silt. | | | New 20' connection @ 1504. Cleaned out cyclone. Resumed drilling @ 1520. |
| 60 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/30/12 13:38 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 73% very fine to medium sand; 1% coarse to very coarse sand; 1% gravel to 10mm; subangular to subrounded; 25% silt. | SM | Cement Grout | New 20' connection @ 1530. Resumed drilling @ 1540. |
| 65 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 70% very fine to medium sand; 5% coarse to very coarse sand; 25% silt. | | | |
| 70 | | | | | Silty SAND (SM); red (2.5YR 4/8); moist; loose; 62% very fine to medium sand; 3% gravel to 20mm; angular to subangular; 25% silt; 10% clay; nonplastic. | | | |
| 75 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 60% very fine to medium sand; 40% silt. | | | |
| 80 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 62% very fine to medium sand; 3% coarse sand; 35% silt. | | | |
| 85 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 65% very fine to medium sand; 5% coarse sand; 25% silt; 5% clay. | | | |
| 90 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/30/12 13:38 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Silty SAND (SM); reddish brown (2.5YR 4/4); moist; loose; 60% very fine to medium sand; 40% silt. | SM | | |
| 95 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); moist; loose; 95% very fine to medium sand; 5% silt. | SP | | New 20' connection @ 1600. Resumed drilling @ 1610. |
| 100 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 62% very fine to medium sand; 3% coarse to very coarse sand; 35% silt. | SM | | |
| 105 | | | | | Silty SAND (SM); red (2.5YR 4/8); moist; loose; 64% very fine to medium sand; 1% coarse sand; 25% silt; 10% clay; nonplastic. | | Cement Grout | |
| 110 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 65% very fine to medium sand; 5% coarse to very coarse sand; 30% silt. | | | |
| 115 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 55% very fine to medium sand; 35% silt; 10% clay; nonplastic. | | | New 20' connection @ 1623. Cleaned out cyclone. Resumed drilling @ 1645. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 55% very fine to medium sand; 35% silt; 10% clay; nonplastic. | SM | | |
| | | | | | No cuttings returned. | | | Clay clogged discharge hose. |
| 125 | | | | | Clayey SAND (SC); reddish brown (5YR 4/4); moist; loose; 50% very fine to fine sand; 10% medium sand; 30% clay; 10% silt; nonplastic. | SC | | |
| 130 | | | | | Silty SAND (SM); yellowish red (5YR 4/6); damp; loose; 70% very fine to medium sand; 30% silt. | | | Cuttings stuck in hose. |
| 135 | | | | | Same as above (130 ft). | SM | Cement Grout | End of 2/23/12. Resumed drilling @ 0745 on 2/24/12. |
| 140 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); damp to wet; loose; 95% fine to medium sand; 5% coarse sand; pumice. | SP | | Possible perched water table. No odor. |
| 145 | | | | | No cuttings returned. | | | |
| 150 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/30/12 13:38 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Poorly graded SAND with Silt (SP-SM); reddish brown (5YR 4/4); damp; loose; 84% fine to medium sand; 5% coarse sand; 1% gravel to 10mm; subangular to rounded; 10% silt; no odor. Note: pumice. | SP-SM | | |
| 155 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); damp; loose; 100% fine to medium sand; no odor. | SP | | New 20' connection @ 0817. Cleaned out cyclone. Resumed drilling @ 0850. |
| 160 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); damp; loose; 99% fine to very coarse sand; 1% gravel to 5mm; angular to subrounded. Note: gravel is composed of pumice. | | | |
| 165 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); damp; loose; 85% fine to coarse sand; 10% very coarse sand; 5% gravel to 8mm; subrounded to rounded. | | Cement Grout | |
| 170 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); damp; loose; 100% fine to coarse sand. | | | |
| 175 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); moist; loose; 95% fine to coarse sand; 5% very coarse sand. | | | New 20' connection @ 0920. Resumed drilling @ 0932. |
| 180 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/30/12 13:38 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); moist; loose; 90% very fine to medium sand; 5% coarse to very coarse sand; 5% silt and clay. | | | |
| 185 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); moist; loose; 85% very fine to coarse sand; 5% very coarse sand; 5% gravel to 8mm; subrounded to rounded; 5% silt and clay. | | | |
| 190 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); moist; loose; 100% fine to coarse sand. | | | |
| 195 | | | | | Poorly graded SAND with Gravel (SP); reddish brown (5YR 4/4); moist; loose; 85% fine to very coarse sand; 15% gravel to 10mm; angular to subrounded. | SP | Cement Grout | New 5' connection @ 0950. Resumed drilling @ 1002. |
| 200 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); damp; loose; 90% fine to medium sand; 10% coarse sand. | | | New connection @ 1010. Resumed drilling @ 1400. |
| 205 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; loose; 95% very fine to coarse sand; 5% silt and clay. | | | |
| 210 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/30/12 13:38 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | | | | |
| 215 | | | | | Poorly graded GRAVEL with Sand (GP); reddish brown (5YR 4/4); moist; loose; 60% gravel to 20mm; subangular to rounded; 40% fine to very coarse sand. Note: gravel is composed of limestone, quartz, chert, and granite. | GP | | |
| 220 | | | | | Poorly graded SAND with Gravel (SP); reddish brown (5YR 4/4); moist; loose; 75% fine to coarse sand; 10% very coarse sand; 15% gravel to 20mm; subangular to subrounded. | SP | | New 20' connection @ 1411. Resumed drilling @ 1419. |
| 225 | | | | | Well graded SAND with Gravel (SW); reddish brown (5YR 4/4); moist; loose; 80% sand; 20% gravel to 10mm; angular to subrounded. | SW | Cement Grout | |
| 230 | | | | | Well graded SAND with Gravel (SW); reddish brown (5YR 5/4); moist; loose; 70% sand; 30% gravel to 15mm; subangular to rounded. | | | |
| 235 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/3); moist; loose; 85% fine to coarse sand; 5% very coarse sand; 10% gravel to 10mm; subrounded to rounded. | SP | | |
| 240 | | | | | Poorly graded SAND with Gravel (SP); reddish brown (5YR 4/3); moist; loose; 75% fine to coarse sand; 10% very coarse sand; 15% gravel to 20mm; subangular to rounded. | | | New 20' connection @ 1436. Resumed drilling @ 1449. |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/30/12 13:38 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

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**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND with Gravel (SP); brown (7.5YR 4/4); moist; loose; 75% fine to coarse sand; 5% very coarse sand; 20% gravel to 12mm; subangular to rounded. | SP | Cement Grout | New 20' connection @ 1503. Resumed drilling @ 1510. |
| 245 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; loose; 99% fine to coarse sand; 1% gravel to 25mm; subrounded to rounded. | | | |
| 250 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; loose; 100% fine to coarse sand. | | | |
| 255 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; loose; 100% medium to very coarse sand. Note: some pumice. | | | |
| 260 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; loose; 100% fine to coarse sand. | | | |
| 265 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/4); damp; loose; 100% very fine to medium sand; no odor. | | | |
| 270 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/30/12 13:38 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/4); damp; loose; 100% fine to coarse sand; strong odor. | SP | | |
| 275 | | | | | Silty SAND (SM); brown (7.5YR 4/4); moist; loose; 70% very fine to fine sand; 20% silt; 10% clay; strong odor. | SM | | New 20' connection @ 1525. Resumed drilling @ 1535. Breeze at drillers back. |
| 280 | | | | | Same as above (275 ft). | | | |
| 285 | | | | | Well graded SAND (SW); brown (7.5YR 5/4); moist; loose; 95% sand; 5% silt and clay; slight odor. | SW | Cement Grout | |
| 290 | | | | | Same as above (285 ft); odor. | | | |
| 295 | | | | | Same as above (285 ft); odor | | | New 20' connection @ 1557 Resumed drilling @ 1605. |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/30/12 13:38 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
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Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded SAND (SW); brown (7.5YR 5/4); dry; loose; 100% sand. | SW | | Gravel lense. |
| 305 | | | | | Poorly graded SAND with Gravel (SP); brown (7.5YR 4/4); dry; medium dense; 75% fine to medium sand; 10% coarse to very coarse sand; 15% gravel to 10mm; angular to subrounded. | SP | | |
| 310 | | | | | Well graded GRAVEL with Sand (GW); dry; medium dense; 70% gravel to 25mm; angular; 30% sand; well graded sand. | GW | | |
| 315 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); dry; medium dense; 97% very fine to coarse sand; 3% very coarse sand. | SP | Cement Grout | New 20' connection and resumed drilling @ 1644. |
| 320 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/2); dry; medium dense; 100% fine to medium sand. | | | |
| 325 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/2); dry; medium dense; 90% fine to medium sand; 10% coarse to very coarse sand. | | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/30/12 13:38 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/2); dry; medium dense; 85% fine to medium sand; 15% coarse to very coarse sand. | | Cement Grout; Top of Bentonite Seal | |
| 335 | | | | | Same as above (330 ft). | | | End of 2/24/12. Resumed drilling @ 0800 on 2/27/12. |
| 340 | | | | | Poorly graded SAND with Gravel (SP); brown (7.5YR 5/2); dry; medium dense; 75% fine to coarse sand; 10% very coarse sand; 15% gravel to 10mm; angular to subrounded. | | | |
| 345 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/2); dry; medium dense; 100% fine to very coarse sand. | SP | | |
| 350 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); moist; medium dense; 90% fine to medium sand; 10% coarse to very coarse sand. | | | |
| 355 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); dry; medium dense; 100% fine to coarse sand. | | | New 20' connection @ 0820. Resumed drilling @ 0920. |
| 360 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 4/30/12 13:38 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

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**Client:** US Army Corps of Engineers
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**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); dry; medium dense; 95% fine to very coarse sand; 5% gravel to 8mm; angular to subangular. | | | |
| 365 | | | | | Same as above (360 ft). | | | |
| 370 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); dry; medium dense; 95% fine to coarse sand; 5% very coarse sand. | | Bentonite Seal | |
| 375 | | | | | Same as above (370 ft). | SP | | New 20' connection @ 0955. Resumed drilling @ 1015. |
| 380 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); dry; medium dense; 100% fine to medium sand. | | | |
| 385 | | | | | Poorly graded SAND with Gravel (SP); brown (7.5YR 5/3); dry; medium dense; 75% fine to medium sand; 10% coarse to very coarse sand; 15% gravel to 15mm; angular to subangular. | | Top of 0.25/8 Sand | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); brown (7.5YR 4/4); dry; medium dense; 90% sand; 5% gravel to 5mm; angular to subrounded; 5% silt and clay. | SW | Top of 0.050 Slot Screen | |
| 395 | | | | | Silty SAND (SM); yellowish red (5YR 4/6); moist; medium dense; 70% very fine to medium sand; 10% coarse to very coarse sand; 20% silt. | SM | | New 20' connection @ 1032. Resumed drilling @ 1043. |
| 400 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/4); moist; medium dense; 95% very fine to medium sand; 5% silt and clay. | SP | | |
| 405 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/4); moist; medium dense; 95% very fine to fine sand; 5% silt and clay. | | | |
| 410 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); dry; medium dense; 95% fine to coarse sand; 5% very coarse sand. | | | |
| 415 | | | | | Same as above (410 ft). | | | New 20' connection @ 1107. Resumed drilling @ 1120. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); dry; medium dense; 100% fine to coarse sand. | SP | | |
| 425 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); dry; medium dense; 100% fine to medium sand. | | 0.050 Slot Screen | |
| 430 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/3); dry; medium dense; 80% very fine to medium sand; 10% coarse to very coarse sand; 5% gravel to 5mm; angular; 5% silt and clay. | | | |
| 435 | | | | | Poorly graded SAND with Gravel (SP); brown (7.5YR 4/4); moist; medium dense; 75% very fine to medium sand; 5% coarse to very coarse sand; 15% gravel to 12mm; angular to rounded; 5% silt and clay. | | | New 20' connection @ 1145. Resumed drilling @ 1245. |
| 440 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; medium dense; 90% fine to medium sand; 10% coarse sand; slight odor. | | Bottom of Screen<br>Top of Bentonite Seal | |
| 445 | | | | | Same as above (440 ft); 15% coarse sand; slight odor. | | | |
| 450 | | | | | | | Top of 0.25/8 Sand | |

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# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; medium dense; 100% fine to medium sand. | | Top of 0.050 Slot Screen | |
| 455 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/3); moist; medium dense; 85% fine to medium sand; 10% coarse sand; 5% silt and clay. | | | New 20' connection @ 1313. Resumed drilling @ 1322. |
| 460 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); moist; medium dense; 100% fine to coarse sand. | | | |
| 465 | | | | | Poorly graded SAND with Gravel (SP); light brown (7.5YR 6/3); dry; medium dense; 85% fine to very coarse sand; 15% gravel to 10mm; angular to subrounded. | SP | | |
| 470 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); dry; medium dense; 90% fine to coarse sand; 10% very coarse sand. | | | |
| 475 | | | | | Poorly graded SAND with Gravel (SP); light brown (7.5YR 6/3); dry; medium dense; 70% very fine to very coarse sand; 25% gravel to 10mm; angular to subrounded; 5% silt and clay. | | | New 20' connection @ 1350. Resumed drilling @ 1400. |
| 480 | | | | | | | | |

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# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/4); damp; medium dense; 100% fine to coarse sand; strong odor. | SP | | |
| 485 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/4); dry to moist; medium dense; 85% very fine to medium sand; 15% coarse sand. | | | |
| 490 | | | | | Well graded SAND (SW); brown (7.5YR 4/4); moist; medium dense; 95% sand; 5% silt and clay. | SW | Bottom of 0.050 Slot Screen / Top of 0.030 Slot Screen | |
| 495 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/4); moist; medium dense; 95% very fine to coarse sand; 5% silt and clay. | SP | | New 20' connection @ 1439. Resumed drilling @ 1445. |
| 500 | | | | | Clayey SAND with Gravel (SC); dark brown (7.5YR 3/4); damp; dense; 60% fine to very coarse sand; 25% gravel to 24mm; subangular to subrounded; 15% clay; nonplastic. | SC | | |
| 505 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/4); damp; dense; 90% fine to very coarse sand; 5% gravel to 10mm; angular to subrounded; 5% silt and clay. | SP | | |
| 510 | | | | | | | | |

# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 510 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/4); damp; dense; 99% medium to very coarse sand; 1% gravel to 8mm; angular to subangular. | SP | | Heavy bit chatter. Drive casing locked @ 1510. Unlocked @ 1525. |
| 515 | | | | | Silty SAND with Gravel (SM); brown (7.5YR 4/3); saturated; dense; 65% very fine to very coarse sand; 15% gravel to 10mm; subangular to subrounded; 20% silt. | SM | | New 20' connection @ 1531. Resumed drilling @ 1540. |
| 520 | | | | | No cuttings returned. | | | |
| 525 | | | | | No cuttings returned. | | Bottom of Slot Screen<br>Sump | |
| 530 | | | | | No cuttings returned. | | Bottom of Sump | |
| 535 | | | | | No cuttings returned. | | Filter Pack | New connection @ 1630. Resumed drilling @ 1636. |
| 540 | | | | | | | | |

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# Borehole ID: KAFB-106160

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/23/2012
Date TD Reached: 2/27/2012
Date Completed: 3/5/2012

Ground Elevation AMSL (ft): 5343.5
Y Coordinate: 1473283.34
X Coordinate: 1541593.17

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 497.00
At End of Drilling: Not Recorded
After Drilling: 487.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 540 | | | | | No description recorded; cuttings saturated. | | Bottom of Filter Pack<br>Native Backfill | |
| 545 | | | | | | | | Total Depth = 544. Reached @ 1650 on 2/27/12.<br><br>Water added after drilling = 700 gallons. |
| 550 | | | | | | | | |
| 555 | | | | | | | | |
| 560 | | | | | | | | |
| 565 | | | | | | | | |
| 570 | | | | | | | | |

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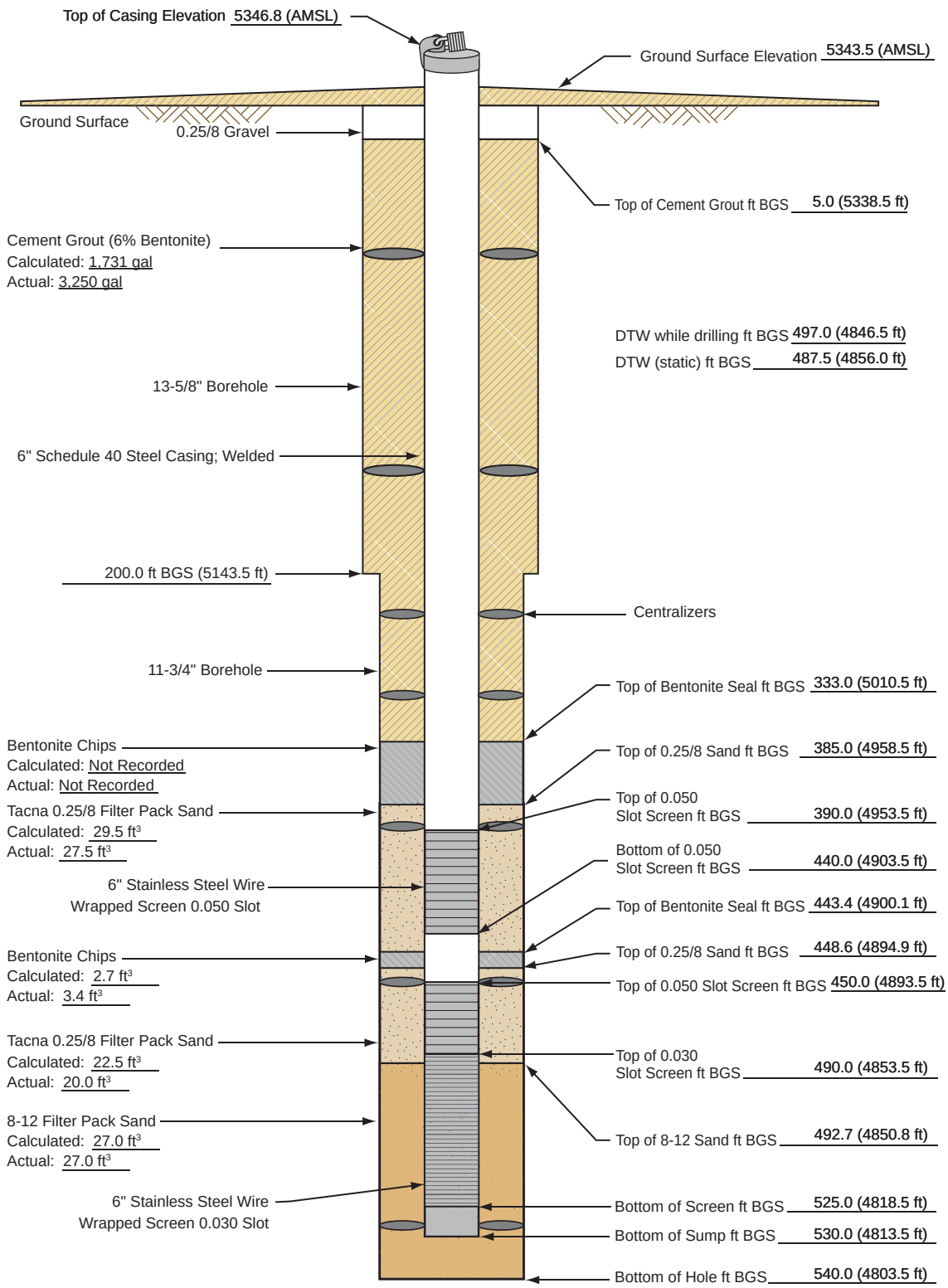
# Soil Vapor Extraction Well KAFB-106160

Installation Start Date/Time: 2/29/2012 @ 0930
Installation End Date/Time: 3/5/2012 @ 1700




(4,816.90) = *Elevations are NAVD 88 Datum values based on NGS Control Station "Hanger", Elevation = 5,343.43 ft. GPS/RTK methods and GEO1D99 model were used to determine elevations of all surveyed points.*

*Not to Scale*
*BGS = Below Ground Surface*

140705.FB010010_SVE_KAFB_106160

Shaw Environmental, Inc.

# Well Development Record

**Project Name**: KAFB BFF

**Location**: BFF

**Well/Piez. No.**: KAFB-106160

**Personnel**: V. Bracht/P. Ostrye

**Date Installed**: 3/5/12

**Date**: 12/14/12 - 12/15/12

**Csg. Diameter (I.D.)**: 6"

**Samplers**: N/A

**Total Depth (ft. BGL)**: 530

**Method of Development**:

X Surging X Bailing X Pumping

X Original Development ☐Redevelopment ☐Other

**Development Date**: 12/14/12, 12/15/12

**Depth to Water Before Developing Well (ft. BGL)**: 485.25

| | Vol. (V) | Purge Factor | Volume to Purge |
|---|---|---|---|
| **Height of Water Column**: feet = | 120.73 gal. | * 1 | = 120.73 |

**$V=(B * r_c^2 * L_c * 7.48)+(B * (r_w^2 - r_c^2) * L_s * Ø_s * 7.48)+(H_2O$ added during drilling/installation) =** 820.73 gallons

**Depth Purging From**: 510 feet

**Time Purging Begins**: 1357, 12/14/12

**Weather**: Rain/Snow, Cold

**Screened Interval (ft BGL)**: 390 - 440 and 450 - 490 (0.050 slot), 490 - 525 (0.030 slot)

**Equipment Nos.**: **pH Meter:** _____ **EC Meter**: _____ **Turbidity Meter**: _____

**Equipment Decontaminated Prior to Development**: Y X N

**Describe**: Steam Cleaned

**Collected Sample of Water Added to Well**: Y N X

**Describe**: N/A

**Comment**: 700 gallons of water added during drilling/well installation activities

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp.°C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 12/14/2012 | 0900 | 488.25 | - - | - - | - - | - - | - - | Begin Bailing |
| 12/14/2012 | 0915 | - - | 15 | - - | - - | - - | - - | Bailed; Water is Brown; Odor |
| 12/14/2012 | 0915 | - - | - - | - - | - - | - - | - - | Begin Swabbing |
| 12/14/2012 | 0956 | - - | - - | - - | - - | - - | - - | Finish Swabbing |
| 12/14/2012 | 1030 | - - | 50 | - - | - - | - - | - - | Bailed; Water is Brown; Odor |
| 12/14/2012 | 1357 | NR | - - | 17.98 | 6.96 | 569.3 | >1000 | Begin Pumping |
| 12/14/2012 | 1410 | NR | 65 | 15.99 | 7.16 | 515.3 | >1000 | Water is Brown; Odor |
| 12/14/2012 | 1420 | NR | 80 | 18.18 | 7.19 | 486.9 | >1000 | Water is Brown; Odor |
| 12/14/2012 | 1440 | NR | 90 | 17.53 | 7.23 | 476.7 | >1000 | Water is Brown; Odor |
| 12/14/2012 | 1510 | NR | 126 | 18.07 | 7.23 | 463.0 | 644.00 | Water is Brown; Odor; P. Ostrye Takes Over |

Notes:
* Water Levels - Reported to the nearest 0.01 foot
* pH - Reading rounded to 0.1 pH units
* Water temperature - Reported to nearest 0.1C
* Turbidity report in NTV nearest whole #
GPM = Gallons Per Minute

Where:
B=3.14
$Ø_s$= porosity of the sand pack
$r_c$= radius of the well casing and screen in feet
$L_c$= length of water column inside the casing and screen in feet
$r_w$= radius of the well bore in feet
$L_s$= length of saturated portion of the sand pack in feet
7.48 gallons/cubic foot= conversion from cubic feet to gallons

Shaw Environmental, Inc.

# Well Development Record

**Project**: KAFB BFF

**Well No**: KAFB-106160

**Project Number**: 140705

**Samplers**: N/A

**Date**: 12/14/12 - 12/15/12

**Checked By**: N/A

**Time Start**: 0900, 12/14/12

**Time Finish**: 1245, 12/15/12

Field Chemistry (cont'd)

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp °C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 12/14/2012 | 1340 | NR | 162 | 18.34 | 7.27 | 449.0 | 428.00 | |
| 12/14/2012 | 1410 | NR | 198 | 18.55 | 7.30 | 444.1 | 325.00 | |
| 12/14/2012 | 1440 | NR | 234 | 19.00 | 7.33 | 434.7 | 127.00 | Stop Pumping for 12/14/12. |
| 12/15/2012 | 1145 | 488.35 | 234 | 18.23 | 6.97 | 434.6 | 152.00 | Continue Pumping @ 11 GPM |
| 12/15/2012 | 1200 | 489.04 | 399 | 20.28 | 6.95 | 417.9 | 67.60 | |
| 12/15/2012 | 1215 | 489.03 | 564 | 18.52 | 6.95 | 411.2 | 8.86 | |
| 12/15/2012 | 1230 | 489.03 | 729 | 19.07 | 6.95 | 410.5 | 8.21 | |
| 12/15/2012 | 1235 | 489.05 | 784 | 18.86 | 6.95 | 409.5 | 9.62 | |
| 12/15/2012 | 1240 | 489.04 | 839 | 18.75 | 6.95 | 410.3 | 8.49 | |
| 12/15/2012 | 1245 | 489.03 | 894 | 18.81 | 6.95 | 409.1 | 9.72 | Stop Pumping; Total Removed |

**Was well sampled after development?** YES NO X

**Sample Method**: N/A

**Sample Name**: N/A

**Analyses**: N/A

# Borehole ID: KAFB-106161

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
Date Completed: 2/23/2012

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | No description recorded. | | Cement | Hand augered. |
| 5 | | | | | No description recorded. | | Top of Cement Grout | Began drilling @ 1500 on 2/6/12. |
| 10 | | | | | Silty SAND (SM); reddish brown (2.5YR 4/4); moist; loose; 82% fine to coarse sand; 3% gravel to 10mm; subangular to subrounded; 15% silt. | SM | | |
| 15 | | | | | Clayey SAND (SC); dark reddish brown (2.5YR 3/4); moist; loose; 70% fine to medium sand; 20% clay; 10% silt; nonplastic. | SC | | New 20' connection @ 1510. Resumed drilling @ 1530. |
| 20 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 70% fine to medium sand; 10% coarse sand; 15% silt; 5% clay; nonplastic. | | | |
| 25 | | | | | Same as above (20 ft). | SM | | |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 3/20/12 13:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106161

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
Date Completed: 2/23/2012

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 70% very fine to medium sand; 20% silt; 10% clay; nonplastic. | | | |
| 35 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 75% fine to medium sand; 5% coarse sand; 5% gravel to 10mm; angular to subangular; 15% silt. | SM | | New 20' connection @ 1547. Resumed drilling @ 1602. |
| 40 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 65% fine to medium sand; 5% coarse to very coarse sand; 5% gravel to 10mm; angular to subrounded; 20% silt; 5% clay. | | | |
| 45 | | | | | Poorly graded SAND with Silt (SP-SM); red (2.5YR 4/8); moist; loose; 75% fine to medium sand; 10% coarse to very coarse sand; 5% gravel to 10mm; angular; 10% silt. | SP-SM | Cement Grout | |
| 50 | | | | | No description recorded. | | | |
| 55 | | | | | Silty SAND (SM); red (2.5YR 4/8); moist; loose; 70% fine to medium sand; 10% coarse to very coarse sand; 20% silt. | SM | | New 20' connection @ 1615. Resumed drilling. |
| 60 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 3/20/12 13:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106161

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
Date Completed: 2/23/2012

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 70% fine to medium sand; 10% coarse to very coarse sand; 20% silt. | SM | Cement Grout | End of 2/6/12. Resumed drilling on 2/7/12. |
| 65 | | | | | Silty SAND (SM); red (2.5YR 4/8); moist; loose; 65% very fine to medium sand; 5% coarse sand; 30% silt. | | | |
| 70 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 65% very fine to medium sand; 5% coarse to very coarse sand; 5% gravel to 4mm; angular; 25% silt. | | | |
| 75 | | | | | Silty SAND (SM); red (2.5YR 4/8); moist; loose; 67% very fine to medium sand; 3% coarse sand; 30% silt. | | | |
| 80 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 55% very fine to medium sand; 10% coarse sand; 35% silt. | | | |
| 85 | | | | | Same as above (80 ft). | | | |
| 90 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 3/20/12 13:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106161

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
Date Completed: 2/23/2012

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 65% fine to medium sand; 5% coarse to very coarse sand; 30% silt. | | | |
| 95 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 80% very fine to medium sand; 20% silt. | SM | | New 20' connection @ 0917. Resumed drilling @ 0930. |
| 100 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); moist; loose; 95% fine to coarse sand; 5% silt and clay. | | | |
| 105 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); moist; loose; 95% fine to coarse sand; 5% silt and clay. | SP | Cement Grout | |
| 110 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 65% very fine to medium sand; 5% coarse sand; 30% silt. | | | |
| 115 | | | | | Silty SAND (SM); yellowish red (5YR 5/6); moist; loose; 85% very fine to medium sand; 15% silt. | SM | | New 20' connection @ 0954. Cleaned out cyclone. Resumed drilling @ 1030. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106161

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
Date Completed: 2/23/2012

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Silty SAND (SM); yellowish brown (5YR 5/6); moist; loose; 60% very fine to medium sand; 5% coarse to very coarse sand; 35% silt. | | | |
| 125 | | | | | Same as above (120 ft). | SM | | |
| 130 | | | | | Silty SAND (SM); yellowish brown (5YR 5/6); moist; loose; 70% very fine to medium sand; trace coarse sand; 30% silt. | | | |
| 135 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); dry; loose; 95% very fine to medium sand; 5% clay; non to low plasticity. | | Cement Grout | New 20' connection @ 1105. Resumed drilling @ 1130. |
| 140 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); dry; loose; 92% fine to medium sand; 3% coarse to very coarse sand; 5% clay; non to low plasticity. | SP | | |
| 145 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); dry; loose; 100% fine to coarse sand. | | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106161

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
Date Completed: 2/23/2012

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Silty SAND (SM); red (5YR 4/6); moist; loose; 80% very fine to coarse sand; 5% very coarse sand; trace gravel; 15% silt. | SM | | |
| 155 | | | | | Poorly graded SAND with Silt (SP-SM); reddish brown (5YR 5/4); moist; loose; 85% very fine to medium sand; 5% coarse to very coarse sand; 10% silt. | SP-SM | | New 20' connection @ 1150. Resumed drilling @ 1245. |
| 160 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/3); dry; loose; 95% very fine to very coarse sand; 5% silt and clay. | SP | | |
| 165 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); moist; loose; 90% very fine to very coarse sand; 10% gravel to 15mm; angular to subrounded. Note: pumice fragments to 6mm; rounded. | | Cement Grout | |
| 170 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/3); dry; loose; 100% very fine to medium sand. | | | |
| 175 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); moist; loose; 85% very fine to medium sand; 5% coarse to very coarse sand; 5% gravel to 4mm; subrounded to rounded; 5% silt and clay. Note: pumice fragments to 4mm; rounded. | | | New 20' connection @ 1315. Resumed drilling @ 1325. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106161

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
Date Completed: 2/23/2012

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/3); dry; loose; 95% very fine to medium sand; 5% silt and clay. | | | |
| 185 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); dry; loose; 90% very fine to medium sand; 5% coarse to very coarse sand; 5% silt and clay. | | | |
| 190 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); dry; loose; 95% very fine to medium sand; 5% silt and clay. | SP | | |
| 195 | | | | | Same as above (190 ft). | | Cement Grout | New 5' connection @ 1353. Resumed drilling @ 1405. |
| 200 | | | | | Same as above (190 ft). | | | New 20' connection @ 1410. Resumed drilling @ 1705. |
| 205 | | | | | No cuttings returned. | | | |
| 210 | | | | | Poorly graded SAND with Gravel (SP); reddish brown (5YR 4/4); damp; loose; 75% fine to medium sand; 10% coarse | SP | | |

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# Borehole ID: KAFB-106161

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
Date Completed: 2/23/2012

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | to very coarse sand; 15% gravel to 13mm; subangular to rounded. | | | Possible perched water table; cuttings were very damp. End of 2/7/12. Resumed drilling @ 0820 on 2/8/12. |
| 215 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); moist; loose; 90% fine to coarse sand; 5% very coarse sand; 5% gravel to 8mm; subrounded. | | | New 20' connection @ 0825. Resumed drilling @ 0852. |
| 220 | | | | | Poorly graded SAND with Gravel (SP); brown (7.5YR 5/4); moist; loose; 80% fine to very coarse sand; 20% gravel to 10mm; subangular to subrounded. | | | |
| 225 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; loose; 93% fine to coarse sand; 5% very coarse sand; 3% gravel to 5mm; subangular to subrounded. | SP | Cement Grout | |
| 230 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); moist; loose; 97% fine to coarse sand; 3% gravel to 10mm; subrounded. Note: pumice fragments to 5mm; rounded. | | | |
| 235 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); moist; loose; 100% fine to coarse sand. | | | New 20' connection @ 0903. Resumed drilling @ 0912. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106161

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
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Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); moist; loose; 100% fine to coarse sand. | SP | | |
| 245 | | | | | Well graded SAND (SW); reddish brown (7.5YR 5/4); moist; loose; 85% sand; 10% gravel to 5mm; angular to subangular; 5% silt and clay. | SW | | |
| 250 | | | | | Silty SAND (SM); reddish brown (5YR 5/4); moist; medium dense; 64% very fine to medium sand; 1% gravel to 8mm; rounded; 35% silt. | SM | | |
| 255 | | | | | Silty SAND (SM); light reddish brown (5YR 6/3); moist; medium dense; 64% very fine to medium sand; 1% gravel to 20mm; rounded; 35% silt. | SM | Cement Grout | New 20' connection @ 0930. Resumed drilling @ 1053. |
| 260 | | | | | Silty SAND (SM); reddish brown (5YR 6/3); moist; loose; 60% fine to coarse sand; 5% very coarse sand; 30% silt. Note: gravel is composed of pumice. | SM | | |
| 265 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); moist; firm; 60% silt; 40% very fine to fine sand. | ML | | |
| 270 | | | | | Silty SAND (SM); brown (7.5YR 5/4); moist; medium dense; 80% very fine to medium sand; 5% coarse sand; 15% silt. | SM | | |

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# Borehole ID: KAFB-106161

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
Date Completed: 2/23/2012

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Silty SAND (SM); brown (7.5YR 5/4); moist; medium dense; 80% very fine to medium sand; 5% coarse sand; 15% silt. | SM | | |
| 275 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; medium dense; 85% very fine to medium sand; 10% coarse sand; 5% silt and clay. | SP | | New 20' connection @ 1110. Resumed drilling @ 1120. |
| 280 | | | | | Clayey SAND (SC); reddish brown (5YR 5/4); moist; medium dense; 70% very fine to fine sand; 20% clay; 10% silt; nonplastic. | SC | | |
| 285 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; medium dense; 95% fine to medium sand; 5% silt and clay. | | Cement Grout | |
| 290 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; medium dense; 100% fine to coarse sand. | SP | | |
| 295 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; medium dense; 100% fine to coarse sand. | | | New 20' connection @ 1135. Resumed drilling @ 1150. |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 3/20/12 13:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

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**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
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Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Clayey GRAVEL (GC); gravel lense with clay. | GC | | Possible perched layer. |
| | | | | | Well graded SAND with Gravel (SW); reddish brown (5YR 4/4); moist; medium dense; 75% sand; 20% gravel to 10mm; angular to subangular; 5% silt and clay. | SW | | |
| 305 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); moist; medium dense; 95% fine to medium sand; 5% very coarse sand. | SP | | |
| 310 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); dry; medium dense; 85% very fine to medium sand; 10% coarse to very coarse sand; 5% silt and clay. | | | |
| 315 | | | | | Well graded SAND with Gravel (SW); reddish brown (5YR 5/4); dry; medium dense to dense; 70% sand; 30% gravel to 12mm; angular to subangular. | SW | Cement Grout | Heavy bit chatter. New 20' connection @ 1230. Resumed drilling @ 1445. Heavy bit chatter; added water to cyclone for dust suppression. |
| 320 | | | | | Well graded SAND with Gravel (SW); reddish brown (5YR 5/4); dry; medium dense to dense; 70% sand; 30% gravel to 15mm; angular to subangular. | | | |
| 325 | | | | | Poorly graded SAND (SP); light reddish brown (5YR 6/3); dry; loose; 95% fine to medium sand; 5% coarse sand. | SP | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 3/20/12 13:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

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**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
Date Completed: 2/23/2012

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); dry; medium dense; 100% fine to very coarse sand. | SP | | Heavy bit chatter. |
| 335 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); dry; medium dense; 97% fine to coarse sand; 3% very coarse sand. | SP | | New 20' connection @ 1505. Resumed drilling @ 1530. Heavy bit chatter; added water to cyclone for dust suppression. |
| 340 | | | | | Clayey SAND (SC); yellowish red (5YR 4/6); damp; medium dense; 60% very fine to very coarse sand; 40% clay; plastic. | SC | Cement Grout | |
| 345 | | | | | Poorly graded SAND (SP); light reddish brown (5YR 6/3); dry; loose; 80% very fine to medium sand; 15% coarse to very coarse sand; 5% gravel to 10mm; subrounded. | SP | | |
| | | | | | Poorly graded GRAVEL (GP); lense; gravel to 20mm; subangular to rounded. | GP | | |
| 350 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); dry; loose; 95% very fine to very coarse sand; 5% silt and clay. | SP | | |
| 355 | | | | | Well graded SAND (SW); brown (7.5YR 4/3); dry; loose; 95% sand; 5% silt and clay. | SW | Top of Bentonite Seal | New 20' connection @ 1550. Resumed drilling @ 1600. |
| 360 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 3/20/12 13:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106161

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**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
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Date Completed: 2/23/2012

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); dry; medium dense; 95% fine to coarse sand; 5% silt and clay. | SP | | |
| 365 | | | | | Poorly graded SAND with Gravel (SP); brown (7.5YR 4/4); dry; dense; 60% fine to very coarse sand; 40% gravel to 12mm; subangular to subrounded. | | | |
| 370 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; medium dense; 90% medium to very coarse sand; 10% gravel to 10mm; subrounded to rounded. | | Bentonite Seal | |
| 375 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; medium dense; 95% fine to coarse sand; 5% very coarse sand. | | | New 20' connection @ 1632. Resumed drilling @ 1645. Added water to cyclone for dust suppression. |
| 380 | | | | | Poorly graded SAND (SP); wet; medium dense; 100% fine to coarse sand. | | | |
| 385 | | | | | Poorly graded SAND (SP); wet; medium dense; 100% medium to very coarse sand. | | Top of 0.25/8 Sand | |
| 390 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 3/20/12 13:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

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**Project Number:** 140705

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Y Coordinate: 1473334.69
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Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); damp; medium dense; 95% fine to medium sand; 5% coarse sand. | | Top of 0.050 Slot Screen | Added water to cyclone for dust suppression. |
| 395 | | | | | Poorly graded SAND with Gravel (SP); brown (7.5YR 5/4); wet; medium dense; 85% fine to very coarse sand; 15% gravel to 5mm; subangular to subrounded. | SP | | End of 2/8/12. Resumed drilling @ 0815 on 2/9/12. |
| 400 | | | | | Well graded SAND (SW); brown (7.5YR 5/4); dry; medium dense; 100% sand. | SW | | |
| 405 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; medium sand; 100% fine to coarse sand. Note: gravel lense at 408 ft; 1 ft thick. | | | |
| 410 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; medium sand; 100% medium to coarse sand. | SP | | |
| 415 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; medium dense; 80% fine to coarse sand; 10% very coarse sand; 10% gravel to 10mm; subangular to subrounded. | | | New 20' connection @ 0837. Resumed drilling @ 0913. |
| 420 | | | | | | | | |

# Borehole ID: KAFB-106161

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
Date Completed: 2/23/2012

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/4); damp; medium dense; 90% fine to coarse sand; 10% very coarse sand. | | | |
| 425 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/4); damp; medium dense; 94% fine to coarse sand; 3% very coarse sand; 3% gravel to 5mm; subrounded to rounded. | SP | 0.050 Slot Screen | |
| 430 | | | | | Poorly graded SAND with Gravel (SP); brown (7.5YR 4/4); moist; medium dense; 85% very fine to very coarse sand; 15% gravel to 10mm; subangular to subrounded. | | | |
| 435 | | | | | Well graded SAND with Gravel (SW); brown (7.5YR 4/4); moist; medium dense; 85% sand; 15% gravel to 15mm; angular to subrounded. | SW | | New 20' connection @ 0935. Resumed drilling @ 0943. |
| 440 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/4); moist; medium dense; 92% fine to coarse sand; 5% very coarse sand; 3% gravel to 5mm; angular to subrounded. | | Bottom of Screen<br>Top of Bentonite Seal | |
| 445 | | | | | Poorly graded SAND (SP); strong brown (7.5YR 4/6); moist; medium dense; 91% very fine to medium sand; 3% coarse to very coarse sand; 1% gravel to 10mm; angular to rounded; 5% silt and clay. | SP | Top of 0.25/8 Sand | Petroleum odor from cyclone; breathing zone 0.0 ppm. |
| 450 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 3/20/12 13:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106161

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
Date Completed: 2/23/2012

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; medium dense; 97% very fine to medium sand; 3% coarse to very coarse sand; odor. | | Top of 0.050 Slot Screen | |
| 455 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; medium dense; 94% very fine to medium sand; 5% coarse to very coarse sand; 1% gravel to 10mm; angular to subrounded; odor. | SP | | New 20' connection @ 1007. Resumed drilling @ 1020. |
| 460 | | | | | Well graded SAND (SW); brown (7.5YR 5/4); moist; medium dense; 90% sand; 10% gravel to 5mm; angular to subrounded; odor. | SW | | |
| 465 | | | | | Poorly graded SAND (SP); strong brown (7.5YR 4/6); moist; medium dense; 94% very fine to medium sand; 5% coarse to very coarse sand; 1% gravel to 8mm; angular to subangular; odor. | | | |
| 470 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; medium dense; 100% very fine to very coarse sand; odor. | SP | | |
| 475 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; medium dense to dense; 95% very fine to medium sand; 5% coarse sand; odor. | | | New 20' connection @ 1040. Resumed drilling @ 1057. |
| 480 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 3/20/12 13:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106161

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
Date Completed: 2/23/2012

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/3); dry; medium dense; 100% coarse to very coarse sand. | SP | | |
| 485 | | | | | Well graded SAND with Gravel (SW); light brown (7.5YR 6/3); dry; medium dense to dense; 80% sand; 20% gravel to 12mm; angular to subangular. | SW | | |
| 490 | | | | | Poorly graded SAND with Gravel (SP); brown (7.5YR 4/4); damp; dense; 75% medium to fine sand; 10% coarse to very coarse sand; 15% gravel to 15mm; subangular to subrounded. | SP | Bottom of 0.050 Slot Screen / Top of 0.030 Slot Screen | |
| 495 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/3); damp; dense; 90% fine to very coarse sand; 10% gravel to 10mm; subangular to subrounded. | | | New 20' connection @ 1140. Resumed drilling @ 1255. |
| 500 | | | | | No cuttings returned. | | | |
| 505 | | | | | No cuttings returned. | | | |
| 510 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 3/20/12 13:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106161

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
Date Completed: 2/23/2012

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 510 | | | | | No cuttings returned. | | | |
| 515 | | | | | No cuttings returned. | | | New 20' connection @ 1340. Resumed drilling @ 1355. |
| 520 | | | | | Well graded SAND with Gravel (SW); saturated; dense; 75% sand; 20% gravel to 20mm; subangular to subrounded; 5% silt and clay. | SW | | |
| 525 | | | | | Poorly graded GRAVEL with Sand (GP); saturated; dense; 80% gravel to 20mm; angular to rounded; 20% medium to very coarse sand. Note: gravel is composed of quartz, chert, limestone, and granite. | GP | Bottom of Slot Screen<br>Sump | |
| 530 | | | | | Silty SAND (SM); saturated; dense; 72% very fine to medium sand; 10% coarse to very coarse sand; 3% gravel to 10mm; angular to subangular; 15% silt. | | Bottom of Sump | |
| 535 | | | | | Silty SAND (SM); saturated; dense; 79% very fine to medium sand; 5% coarse to very coarse sand; 1% gravel to 5mm; subangular; 15% silt. | SM | Bottom of Filter Pack<br>Native Backfill | |
| 540 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 3/20/12 13:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106161

**Client:** US Army Corps of Engineers
**Project Location:** KAFB, Albuquerque, NM
**Project Name:** KAFB BFF SWMU ST-106 and SS-111
**Project Number:** 140705

Date Started: 2/6/2012
Date TD Reached: 2/9/2012
Date Completed: 2/23/2012

Ground Elevation AMSL (ft): 5345.8
Y Coordinate: 1473334.69
X Coordinate: 1541896.31

Hole Diameter Upper (in.): 13-5/8
Hole Diameter Lower (in.): 11-3/4
Surface Completion Type: Stick-up

Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End of Drilling: Not Recorded
After Drilling: 488.50

Drillling Contractor: WDC Drilling
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye

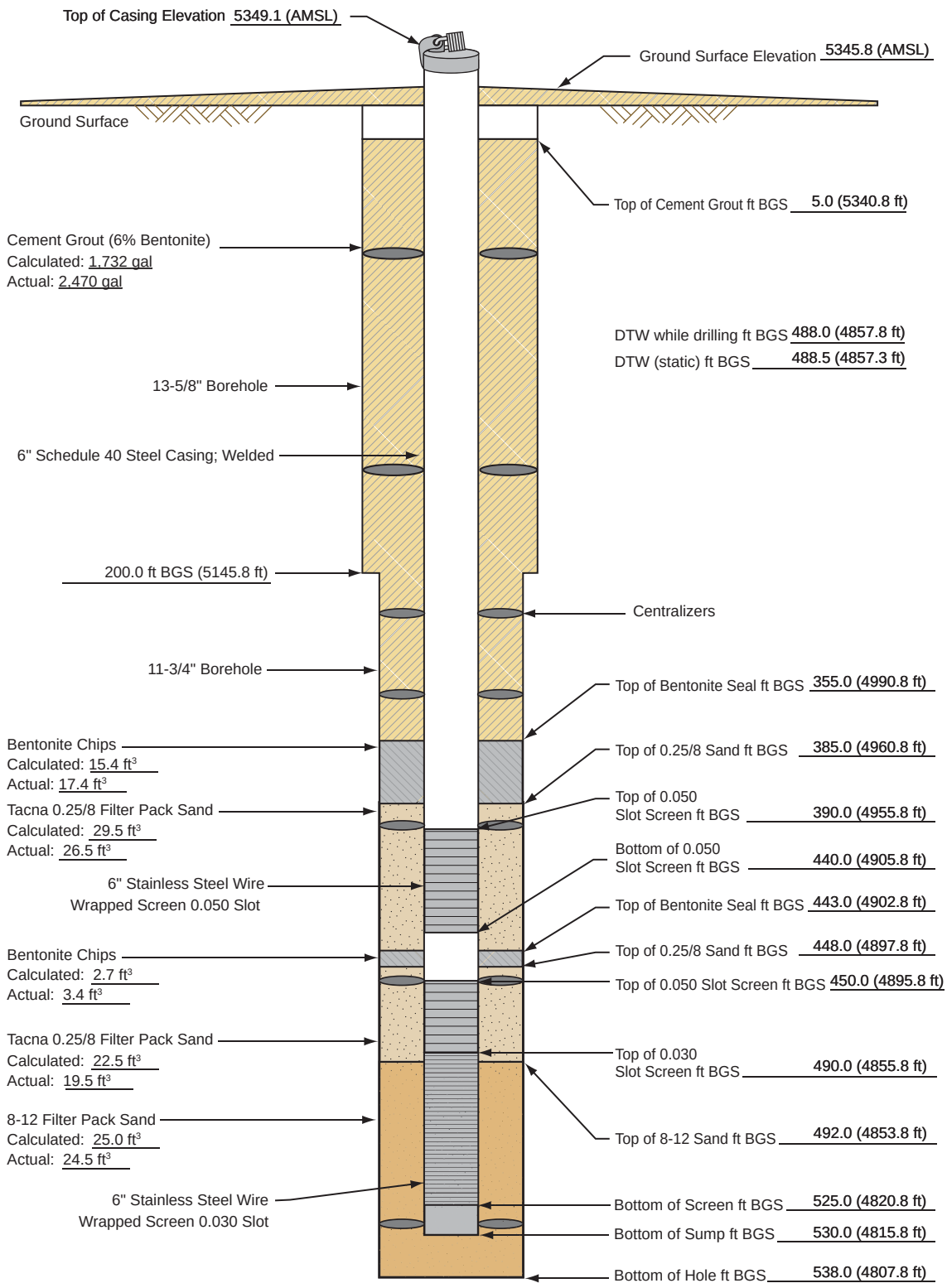


| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 540 | | | | | Silty SAND (SM); saturated; dense; 80% very fine to medium sand; 20% silt. | SM | Native Backfill | |
| 545 | | | | | Same as above (540 ft). | | | |
| 550 | | | | | | | | Total Depth = 548 ft. Reached @ 1513 on 2/9/12. |
| | | | | | | | | Water added during drilling (gallons) = 0 |
| 555 | | | | | | | | Water added after drilling (gallons) = 550 |
| 560 | | | | | | | | |
| 565 | | | | | | | | |
| 570 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 3/20/12 13:53 - Z:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Soil Vapor Extraction Well KAFB-106161

Installation Start Date/Time: 2/13/2012 @ 0915
Installation End Date/Time: 2/23/2012 @ 1720




(4,816.90) = *Elevations are NAVD 88 Datum values based on NGS Control Station "Hanger", Elevation = 5,343.43 ft. GPS/RTK methods and GEO1D99 model were used to determine elevations of all surveyed points.*

*Not to Scale*
*BGS = Below Ground Surface*

140705.FB010010_SVE_KAFB_106161

Shaw Environmental, Inc.

# Well Development Record

**Project Name**: KAFB BFF

**Location**: BFF

**Well/Piez. No.**: KAFB-106161

**Personnel**: V. Bracht

**Date Installed**: 2/23/12

**Date**: 12/11/12, 12/12/12

**Csg. Diameter (I.D.)**: 6"

**Samplers**: N/A

**Total Depth (ft. BGL)**: 530

**Method of Development**:

X Surging X Bailing X Pumping

X Original Development ☐Redevelopment ☐Other

**Development Date**: 12/11/12, 12/12/12

**Depth to Water Before Developing Well (ft. BGL)**: 486.68

| | | Vol. (V) | | Purge Factor | | Volume to Purge |
|---|---|---|---|---|---|---|
| **Height of Water Column**: | feet = | 117.02 | gal. * | 1 | = | 117.02 |

**$V=(B * r_c^2 * L_c * 7.48)+(B * (r_w^2 - r_c^2) * L_s * Ø_s * 7.48)+(H_2O$ added during drilling/installation) =** 667.02 gallons

**Depth Purging From**: 519 feet

**Time Purging Begins**: 1344, 12/12/12

**Weather**: Clear, cool

**Screened Interval (ft BGL)**: 390 - 440 (0.050 slot), 490 - 525 (0.030 slot)

**Equipment Nos.**: **pH Meter:** _____ **EC Meter**: _____ **Turbidity Meter**: _____

**Equipment Decontaminated Prior to Development**: Y X N

**Describe**: Steam Cleaned

**Collected Sample of Water Added to Well**: Y N X

**Describe**: N/A

**Comment**: 550 gallons of water added during drilling/well installation activities

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp.°C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 12/11/2012 | 1517 | 489.98 | - - | - - | - - | - - | - - | Begin Bailing; Muddy and Dark |
| 12/11/2012 | 1600 | | 40 | - - | - - | - - | - - | Bailed; Water is Black and Smelly |
| 12/12/2012 | 0825 | 487.42 | - - | - - | - - | - - | - - | Begin Swabbing |
| 12/12/2012 | 0920 | | - - | - - | - - | - - | - - | Finish Swabbing |
| 12/12/2012 | 1040 | | 50 | - - | - - | - - | - - | Bailed |
| 12/12/2012 | 1310 | 490.48 | - - | - - | - - | - - | - - | Pump Set |
| 12/12/2012 | 1320 | 490.92 | - - | - - | - - | - - | - - | Begin Pumping; Water is Thick |
| 12/12/2012 | 1330 | 490.92 | - - | - - | - - | - - | - - | Water is too Dirty to Take Readings |
| 12/12/2012 | 1344 | 490.87 | 125 | 19.54 | 6.84 | 739.7 | >1000 | Water is Muddy Brown |
| 12/12/2012 | 1350 | 490.87 | 175 | 19.38 | 6.84 | 708.8 | >1000 | Water is Muddy Brown |

Notes:
* Water Levels - Reported to the nearest 0.01 foot
* pH - Reading rounded to 0.1 pH units
* Water temperature - Reported to nearest 0.1C
* Turbidity report in NTV nearest whole #
GPM = Gallons Per Minute

Where:
B=3.14
$Ø_s$= porosity of the sand pack
$r_c$= radius of the well casing and screen in feet
$L_c$= length of water column inside the casing and screen in feet
$r_w$= radius of the well bore in feet
$L_s$= length of saturated portion of the sand pack in feet
7.48 gallons/cubic foot= conversion from cubic feet to gallons

Shaw Environmental, Inc.

# Well Development Record

**Project**: KAFB BFF

**Well No**: KAFB-106161

**Project Number**: 140705

**Samplers**: N/A

**Date**: 12/11/12 - 12/13/12

**Checked By**: N/A

**Time Start**: 1517, 12/11/12

**Time Finish**: 1100, 12/13/12

Field Chemistry (cont'd)

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp °C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 12/12/2012 | 1400 | 490.85 | 225 | 19.38 | 6.84 | 708.8 | >1000 | Water is Muddy Brown; Odor |
| 12/12/2012 | 1410 | 490.84 | 275 | 19.18 | 6.84 | 689.0 | >1000 | Water is Muddy Brown; Odor |
| 12/12/2012 | 1420 | 490.83 | 325 | 18.43 | 6.85 | 691.6 | >1000 | Water is Muddy Brown; Odor |
| 12/12/2012 | 1430 | 490.76 | 375 | 19.24 | 6.84 | 690.0 | >1000 | Water is Brown; Odor |
| 12/12/2012 | 1440 | 490.70 | 425 | 18.83 | 6.84 | 685.0 | >1000 | Water is Brown; Odor |
| 12/12/2012 | 1450 | 490.66 | 475 | 20.22 | 6.84 | 675.6 | >1000 | Water is Brown; Odor |
| 12/12/2012 | 1500 | 490.60 | 500 | 20.28 | 6.84 | 666.2 | 955.00 | Water is Brown; Odor |
| 12/12/2012 | 1510 | 490.58 | 525 | 19.00 | 6.84 | 664.4 | 664.00 | Water is Cloudy; Odor |
| 12/12/2012 | 1520 | 490.58 | 575 | 19.24 | 6.84 | 662.9 | 545.00 | Water is Cloudy; Odor |
| 12/12/2012 | 1530 | 490.55 | 600 | 18.94 | 6.84 | 661.4 | 410.00 | Water is Cloudy; Odor |
| 12/12/2012 | 1540 | 490.54 | 625 | 18.89 | 6.84 | 659.6 | 325.00 | Water is Cloudy; Odor |
| 12/12/2012 | 1550 | 490.52 | 650 | 20.76 | 6.58 | 660.2 | 294.00 | Water is Cloudy; Odor |
| 12/12/2012 | 1600 | 490.52 | 675 | 20.69 | 6.76 | 659.7 | 242.00 | Water is Cloudy; Odor |
| 12/12/2012 | 1610 | 490.52 | 700 | 20.33 | 6.79 | 659.7 | 178.00 | Water is Cloudy; Odor |
| 12/12/2012 | 1620 | 490.50 | 725 | 20.37 | 6.79 | 656.0 | 137.00 | Water is Cloudy; Odor |

**Was well sampled after development?** YES NO X

**Sample Method**: N/A

**Sample Name**: N/A

**Analyses**: N/A

Shaw Environmental, Inc.

# Well Development Record

**Project**: KAFB BFF

**Well No**: KAFB-106161

**Project Number**: 140705

**Samplers**: N/A

**Date**: 12/11/12 - 12/13/12

**Checked By**: N/A

**Time Start**: 1517, 12/11/12

**Time Finish**: 1100, 12/13/12

Field Chemistry (cont'd)

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp.°C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 12/12/2012 | 1630 | 490.50 | 750 | 20.35 | 6.81 | 652.9 | 110 | Water is Cloudy; Odor |
| 12/12/2012 | 1640 | 490.49 | 775 | 20.25 | 6.82 | 653 | 96.4 | Water is Cloudy; Odor |
| 12/13/2012 | 0847 | NR | 800 | 18.32 | 6.64 | 620.7 | >1000 | Water is Cloudy; Odor |
| 12/13/2012 | 0900 | NR | 825 | 17.27 | 6.91 | 667.3 | 41.2 | Water is Cloudy; Odor |
| 12/13/2012 | 0910 | NR | 875 | 17.6 | 6.91 | 678.5 | 39.6 | Water is Cloudy; Odor |
| 12/13/2012 | 0920 | NR | 900 | 20.04 | 6.89 | 673 | 40.3 | Water is Cloudy; Odor |
| 12/13/2012 | 0930 | NR | 925 | 20.22 | 6.88 | 673.6 | 38.2 | Water is Cloudy; Odor |
| 12/13/2012 | 0940 | NR | 950 | 20.14 | 6.88 | 665.6 | 25.6 | Water is Slightly Cloudy; Odor |
| 12/13/2012 | 0950 | NR | 975 | 20.15 | 6.87 | 665.7 | 22.5 | Water is Slightly Cloudy; Odor |
| 12/13/2012 | 1000 | NR | 995 | 19.72 | 6.88 | 663.5 | 18.1 | Water is Slightly Cloudy; Odor |
| 12/13/2012 | 1010 | NR | 1000 | 19.46 | 6.88 | 657.1 | 17.4 | Water is Clear; Odor |
| 12/13/2012 | 1020 | NR | 1025 | 19.23 | 6.89 | 652.4 | 15.1 | Water is Clear; Odor |
| 12/13/2012 | 1030 | NR | 1050 | 19.53 | 6.88 | 658.3 | 12.9 | Water is Clear; Odor |
| 12/13/2012 | 1040 | NR | 1075 | 21.38 | 6.85 | 651.4 | 12.9 | Water is Clear; Odor |
| 12/13/2012 | 1050 | NR | 1100 | 21.42 | 6.85 | 658.4 | 11.4 | Water is Clear; Odor |
| 12/13/2012 | 1100 | NR | 1125 | 21.39 | 6.86 | 653.9 | 9.81 | Water is Clear; Odor |

**Was well sampled after development?** YES NO

**Sample Method**:

**Sample Name**:

**Analyses**:

# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Disturbed. | | Top of Cement Seal | Begin drilling @ 1327. |
| 5 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); dry; soft; low plasticity; 60% silt; 40% fine to coarse sand; trace gravel to 1.5 cm; subrounded; no odor. | ML | | |
| 10 | | | | | SILT (ML); reddish brown (5YR 5/4); dry; soft; low plasticity; 95% silt; 5% very fine sand; no odor. | | | |
| 15 | | | | | Same as above (10 ft); 90% silt; 10% fine to coarse sand;subangular; no odor. | | Cement Seal | Total Depth casing @ 1335.<br>Resume @ 1345. |
| 20 | | | | | Silty SAND (SM); reddish brown (5YR 5/3); dry; loose; low plasticity; 60% fine to medium sand; subangular; 40% silt; no odor. | SM | | |
| 25 | | | | | Same as above (20 ft); trace gravel to 1 cm. | | | |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:20 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Silty SAND (SM); reddish brown (5YR 5/4); dry; loose; 60% very fine to coarse sand; subangular; 5% gravel to 2.5 cm; 35% silt; low plasticity; no odor. | SM | | |
| 35 | | | | | SILT with gravel (ML); reddish brown (5YR 5/4); dry; soft; low plasticity; 70% silt; 10% fine to medium sand; 20% gravel to 3 cm; subangular; no odor. | ML | | Total Depth casing @ 1357. Resume @ 1407. |
| 40 | | | | | Poorly graded SAND with SILT (SP-SM); reddish brown (5YR 5/3); dry; loose; 90% very fine to medium sand; subrounded; 10% silt; no odor. | SP-SM | Top of High Solids Bentonite Grout | |
| 45 | | | | | Silty SAND (SM); reddish brown (5YR 4/3); dry; loose; 60% fine to coarse sand; 5% gravel to 2 cm; 35% silt; low plasticity; no odor. | SM | | |
| 50 | | | | | SILT (ML); reddish brown (5YR 4/4); dry; soft; medium plasticity; 90% fines; 10% very fine sand; subrounded; no odor. | ML | High Solids Bentonite Grout | |
| 55 | | | | | Same as above (50 ft). | ML | | Total Depth @ 1418. Resume @ 1425. |
| 60 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:20 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | | | | |
| | | | | | Well graded SAND with gravel (SW); dark reddish brown (5YR 4/2); dry; loose; 75% very fine to coarse sand; 15% gravel to 2 cm; | SW | | |
| 65 | | | | | | | | |
| | | | | | SILT with sand (ML); reddish brown (5YR 4/4); dry; soft; low plasticity; 85% silt; 15% fine to coarse sand; subrounded; no odor. | | | |
| 70 | | | | | | | | |
| | | | | | Same as above (65 ft). | | High Solids Bentonite Grout | |
| 75 | | | | | | | | |
| | | | | | SILT (ML); reddish brown (5YR 4/4); dry; soft; medium plasticity; 98% fines; 5% very fine sand; subrounded; no odor. | ML | | Total Depth @ 1435. Resume @ 1445. |
| 80 | | | | | | | | |
| | | | | | SILT (ML); reddish brown (5YR 5/4); dry; soft; low plasticity; 75% silt; 25% fine to coarse sand; subrounded; no odor. | | | |
| 85 | | | | | | | | |
| | | | | | SILT (ML); same as above (75 ft). | | | |
| 90 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:20 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); reddish brown (5YR 5/4); dry; soft; low plasticity; 90% silt; 10% fine sand; subrounded; no odor. | | | |
| 95 | | | | | SILT with sand (ML); reddish brown (5YR 5/4); dry; soft; low plasticity; 75% silt; 25% fine to coarse sand; trace gravel to 1 cm; subrounded; no odor. | | | Total Depth @ 1455. Resume @ 1501. |
| 100 | | | | | SILT (ML); Same as above (90 ft). | | High Solids Bentonite Grout | |
| 105 | | | | | Same as above (100 ft). | ML | | |
| 110 | | | | | Same as above (100 ft). | | | |
| 115 | | | | | Same as above (100 ft); medium plasticity. | | | Total Depth @ 1511. Resume @ |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT (ML); reddish brown (5YR 5/4); soft; dry; low plasticity; 90% silt; 10% fine to medium sand; subrounded; no odor. | ML | | |
| 125 | | | | | Lean CLAY (CL); reddish brown (5YR 5/4); dry; frim; medium plasticity; 95% fines; 5% very fine sand; no odor. | CL | | |
| 130 | | | | | SILT (ML); Same as above (120 ft). | | | |
| 135 | | | | | Same as above (130 ft). | | High Solids Bentonite Grout | |
| 140 | | | | | Same as above (130 ft). | ML | | |
| 145 | | | | | Same as above (130 ft). | | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | SILT (ML); reddish brown (5YR 5/4); moist; soft; low plasticity; 95% silt; 5% fine sand; no odor. | ML | | |
| 155 | | | | | Same as above (150 ft). | | | Total Depth @ 1550. Resume @ 1558. |
| 160 | | | | | Same as above (150 ft). | | High Solids Bentonite Grout | |
| 165 | | | | | Lean CLAY (CL); reddish brown (5YR 5/4); soft; dry; medium plasticity; 95% silt; 5% fine to medium sand; subrounded; no odor. | CL | | |
| 170 | | | | | Same as above (165 ft). | | | |
| 175 | | | | | SILT (ML); reddish brown (5YR 5/4); dry; soft; low plasticity; 95% silt; 5% fine to medium sand; subrounded; no odor. | ML | | Total Depth @ 1637. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Lean CLAY (CL); reddish brown (5YR 4/3); moist; firm; medium plasticity; 95% fines; 5% fine sand; no odor. | CL | High Solids Bentonite Grout | Resume drilling @ 0805. |
| 185 | | | | | Same as above (180 ft). | | | |
| 190 | | | | | Same as above (180 ft). | | | Driller adding water to prevent clogging. |
| 195 | | | | | Same as above (180 ft); wet. | | | Total Depth casing @ 0855.<br>Resume @ 0905. |
| 200 | | | | | Same as above (180 ft); trace gravel to 1.5 cm. | | | Total Depth with 11 3/4" casing.<br>Resume with 9 5/8" @ 1300. |
| 205 | | | | | No cuttings returned. | | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | | | | |
| | | | | | Sandy SILT (ML); reddish brown (5YR 5/3); wet; soft; low plasticity; 70% silt; 20% fine to coarse sand; 10% gravel to 1.5 cm; subrounded. | ML | | Driller adding water. |
| 215 | | | | | | | | |
| | | | | | Silty SAND ( SM); reddish brown (5YR 5/3); wet; loose; 85% fine to medium sand; 15% silt; subrounded; no odor. | SM | | Total Depth casing @ 1307. Resume @ 1310. |
| 220 | | | | | | | | |
| | | | | | No cuttings returned. | | | |
| 225 | | | | | | | High Solids Bentonite Grout | |
| | | | | | Poorly graded SAND (SP); brown (10YR 5/3); wet; loose; 95% fine to medium sand; 5% coarse sand; subrounded; no odor. | SP | | |
| 230 | | | | | | | | |
| | | | | | Same as above (225 ft). | | | |
| 235 | | | | | | | | |
| | | | | | Same as above (225 ft). | | | Total Depth @ 1322. Resume @ 1329. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); wet; loose; 80% fine to coarse sand; 20% gravel to 1.5 cm. | SW | | |
| 245 | | | | | Lean CLAY with gravel (CL); yellowish brown (10YR 5/4); wet; soft; medium plasticity; 80% fines; 20% fine gravel to 1 cm; subrounded; no odor. | CL | | |
| 250 | | | | | Same as above (245 ft). | | | |
| 255 | | | | | Same as above (240 ft); well graded sand with gravel. | | High Solids Bentonite Grout | Total Depth @ 1344. Resume @ 1349. |
| 260 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); wet; loose; 100% fine to medium sand; trace coarse sand; subrounded; no odor. | SP | | |
| 265 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; loose; 100% fine to coarse sand; trace gravel to 0.9 cm; subrounded; no odor. | SW | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Well graded SAND with gravel (SW); dark yellowish brown; (10YR 5/4); wet; loose; 85% fine to very coarse sand; 15% gravel to 1 cm; subrounded; no odor. | SW | | |
| 275 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); wet; loose; 100% fine to medium sand; trace coarse sand; subrounded; no odor. | SP | | Total Depth Casing @ 1408. Resume @ 1419. |
| 280 | | | | | Same as above (275 ft); trace gravel to 1/5 cm. | | | |
| 285 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; loose; 100% fine to coarse sand; subrounded; no odor. | SW | | |
| 290 | | | | | Same as above (285 ft). | | High Solids Bentonite Grout | |
| 295 | | | | | Same as above (285 ft). | | | Total Depth casing @ 1445. Resume @ 1450. |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:20 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded GRAVEL with sand (GW); brown (10YR 5/3); moist; loose; 85% fine gravel to 1 cm; 15% fine to medium sand; subrounded; no odor. | GW | | |
| 305 | | | | | Same as above (300 ft). | | | |
| 310 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; loose; 100% fine to coarse sand; trace gravel to 1 cm; subrounded; no odor. | SW | High Solids Bentonite Grout | |
| 315 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); wet; loose; 100% fine to medium sand; trace coarse sans; subrounded; no odor. | SP | | Total Depth @ 1530. Resume @ 0754 on 9/26/12. |
| 320 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; loose; 100% fine to coarse sand; subrounded; no odor. | SW | | |
| 325 | | | | | Same as above (315 ft); poorly graded sand; trace clay nodules. | | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:20 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; loose; 100% fine to medium sand; trace coarse sand; subrounded; no odor. | | | |
| 335 | | | | | Same as above (330 ft). | SP | | Total Depth @ 0841. Resume @ 0916. |
| 340 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% fine to very coarse sand; trace gravel to 1 cm; subrounded; no odor. | | High Solids Bentonite Grout | |
| 345 | | | | | Same as above (340 ft); no gravel. | | | |
| 350 | | | | | Well graded SAND with gravel (SW); grayish brown (10YR 5/2); 80% medium to very coarse sand; 20% gravel to 1 cm; subrounded; no odor. | SW | | |
| 355 | | | | | Well graded SAND (SW); brown (10YR 4/3); wet; loose; 90% fine to coarse sand; 10% gravel to 2.5 cm; subrounded; no odor. | | | Total Depth casing @ 1015. Resume @ 1450. |
| 360 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:20 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); moist; loose; 100% fine to medium sand; trace coarse sand; subrounded; no odor. | SP | | |
| 365 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% fine to coarse sand; trace gravel to 1 cm; subrounded; no odor. | SW | | |
| 370 | | | | | Same as above (360 ft); poorly graded sand. | | | |
| 375 | | | | | Same as above (365 ft); well graded sand. | | High Solids Bentonite Grout | Total Depth @ 1500. Resume @ 1614. |
| 380 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; loose; 95% fine to medium sand; 5% gravel to 2 cm; subrounded; no odor. | SP | | |
| 385 | | | | | Same as above (380 ft). | | | |
| 390 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:20 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); brown (10YR 5/3) dry; loose; 95% fine to medium sand; 5% coarse sand; subrounded; no odor | | | |
| 395 | | | | | Same as above (390 ft). | | | Total Depth @ 1624. Resume @ 1630. |
| 400 | | | | | Same as above (390 ft); 95% fine to medium sand; 5% gravel to 1.5 cm. | SP | | |
| 405 | | | | | Same as above (390 ft). | | | |
| 410 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; loose; 100% fine to very coarse sand; trace gravel to 1.5 cm; subrounded; no odor. | | High Solids Bentonite Grout | |
| 415 | | | | | Same as above (410 ft). | SW | | Total Depth @ 1638. Resume @ 0735 on 9/27/12. |
| 420 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:20 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); dark reddish brown (10YR 3/3); moist; loose; 100% fine to coarse sand; trace gravel to 1.5 cm; subrounded; no odor. | | | |
| 425 | | | | | Same as above (420 ft). | | | |
| 430 | | | | | Same as above (420 ft). | | | |
| 435 | | | | | Same as above (420 ft). | SW | High Solids Bentonite Grout | Total Depth @ 0756. Resume @ 0830. |
| 440 | | | | | Same as above (420 ft). | | | |
| 445 | | | | | Same as above (420 ft). | | | |
| 450 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:20 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Well graded SAND (SW); dark reddish brown (10YR 3/3); moist; loose; 90% fine to coarse sand; 10% gravel to 1 cm; subrounded; no odor | | Top of Bentonite Seal | Driller adding water. |
| | | | | | | | Bentonite Seal | |
| 455 | | | | | Same as above (450 ft). | SW | | Total Depth @ 0844. Resume @ 0855. |
| 460 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); wet; loose; 95% fine to medium sand; 5% gravel to 2 cm; subrounded; no odor. | | 5" Schedule 80 PVC Riser | |
| 465 | | | | | Same as above (450 ft); well graded sand. | | | |
| 470 | | | | | Same as above (460 ft); poorly graded sand; 100% fine to medium sand. | SP | | |
| 475 | | | | | Same as above (470 ft). | | Bentonite Seal | Total Depth @ 0904. Resume @ 0912. |
| 480 | | | | | | | | |

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# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | | | Well graded SAND (SW); brown (10YR 4/3); wet; loose; 100% fine to coarse sand; trace gravel to 1.5 cm; subrounded; no odor. | SW | Top of 20/40 Sand | Driller adding water. |
| 485 | | | | | Same as above (480 ft). | | Top of 10/20 Sand | |
| | | | | | | | Top of 5" Schedule 80 PVC 0.010" Slot Screen | |
| 490 | | | | | Same as above (480 ft). | | | |
| 495 | | | | | Poorly graded SAND (SP); brown (10YR 5/3) moist; loose; 100% fine to medium sand; subrounded; no odor. | SP | | Total Depth @ 0924. Resume @ 0930. |
| 500 | | | | | Same as above (495 ft). | | | |
| 505 | | | | | Same as above (495 ft). | | | |
| 510 | | | | | | | | |

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# Borehole ID: KAFB-106201

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/24/2012
Date TD Reached: 9/24/2012
Date Completed: 9/24/2012
Ground Elevation AMSL (ft): 5354.59
Y Coordinate: 1479107.00
X Coordinate: 1546565.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.05
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 510 | | | | | Poorly graded SAND (SP); brown (10YR 4/3) moist; loose; 100% fine to medium sand; subrounded; no odor. | | | |
| 515 | | | | | Same as above (510 ft). | SP | - Bottom of Screen<br>- Sump | Total Depth @ 0948. Resume @ 0957. |
| 520 | | | | | No cuttings returned. | | - Bottom of Sump | |
| 525 | | | | | No cuttings returned. | | | |
| 530 | | | | | Well graded SAND (SW); brown (10YR 4/3); moist; loose; 95% fine to coarse sand; 5% gravel to 1 cm; subrounded; no odor. | SW | | |
| 535 | | | | | Same as above (530 ft). | | | Total Depth of Hole @ 1026 @ 538 ft bgs. Flood hole with ~ 750 gallons of water. |
| 540 | | | | | | | | |

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Shaw Environmental, Inc.

# Well Development Record

**Project Name**: KAFB BFF

**Location**: Near Production Well

**Well/Piez. No.**: KAFB-106201

**Personnel**: V. Bracht

**Date Installed**: 10/4/12

**Date**: 10/10/12

**Csg. Diameter (I.D.)**: 5"

**Samplers**: N/A

**Total Depth (ft. BGL)**: 522

**Method of Development**:

X Surging X Bailing X Pumping

X Original Development ☐Redevelopment ☐Other

**Development Date**: 10/10/12

**Depth to Water Before Developing Well (ft. BGL)**: 499.38

Vol. (V) Purge Factor Volume to Purge

**Height of Water Column**: feet = 23.05 gal. * 1 = 23.05

**$V=(B * r_c^2 * L_c * 7.48)+(B * (r_w^2 - r_c^2) * L_s * Ø_s * 7.48)+(H_2O$ added during drilling/installation) =** 791.81 gallons

**Depth Purging From**: 513 feet

**Time Purging Begins**: 0835, 10/10/12

**Weather**: Not Recorded

**Screened Interval (ft BGL)**: 487 - 517

**Equipment Nos.**: **pH Meter:** YSI36951 **EC Meter**: YSI 36951 **Turbidity Meter**: LVE003050

**Equipment Decontaminated Prior to Development**: Y X N

**Describe**: Steam Cleaned

**Collected Sample of Water Added to Well**: Y N X

**Describe**: N/A

**Comment**: 750 gallons of water added during drilling/well installation activities

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp.°C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 10/10/2012 | 0835 | 501.57 | - - | - - | - - | - - | - - | Begin Bailing; Thick Slurry Coming Up |
| 10/10/2012 | 0901 | - - | 20 | 18.50 | 9.15 | 1.185 | >1000 | Continue Bailing; Thinned Out |
| 10/10/2012 | 0913 | - - | 40 | 18.66 | 9.23 | 0.920 | >1000 | Continue Bailing; Water is Muddy Brown |
| 10/10/2012 | 0920 | - - | 50 | - - | - - | - - | - - | Bailed; Water is Brown |
| 10/10/2012 | 1025 | 505.17 | - - | 20.32 | 7.89 | 0.690 | >1000 | Begin Pumping |
| 10/10/2012 | 1030 | NR | 100 | 19.67 | 7.96 | 0.575 | 193.00 | Water is Cloudy |
| 10/10/2012 | 1040 | NR | 200 | 20.24 | 7.82 | 0.564 | 51.40 | Water is Slightly Cloudy |
| 10/10/2012 | 1048 | NR | 275 | - - | - - | - - | - - | Pump Off; Take Water to Staging Area |
| 10/10/2012 | 1120 | NR | - - | 20.17 | 7.75 | 0.573 | 26.60 | Resume Pumping |
| 10/10/2012 | 1130 | NR | 400 | 20.61 | 7.63 | 0.577 | 4.84 | Water is Clear |

Notes:
* Water Levels - Reported to the nearest 0.01 foot
* pH - Reading rounded to 0.1 pH units
* Water temperature - Reported to nearest 0.1C
* Turbidity report in NTV nearest whole #
GPM = Gallons Per Minute

Where:
B=3.14
$Ø_s$= porosity of the sand pack
$r_c$= radius of the well casing and screen in feet
$L_c$= length of water column inside the casing and screen in feet
$r_w$= radius of the well bore in feet
$L_s$= length of saturated portion of the sand pack in feet
7.48 gallons/cubic foot= conversion from cubic feet to gallons

Shaw Environmental, Inc.

# Well Development Record

**Project**: KAFB BFF

**Well No**: KAFB-106201

**Project Number**: 140705

**Samplers**: N/A

**Date**: 10/10/12

**Checked By**: N/A

**Time Start**: 0835, 10/10/12

**Time Finish**: 1210, 10/10/12

Field Chemistry (cont'd)

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp °C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 10/10/2012 | 1135 | NR | 450 | 20.63 | 7.62 | 0.578 | 3.01 | Water is Clear |
| 10/10/2012 | 1140 | NR | 500 | 20.63 | 7.61 | 0.580 | 3.06 | Water is Clear |
| 10/10/2012 | 1145 | NR | 550 | 20.68 | 7.62 | 0.582 | 3.80 | Water is Clear |
| 10/10/2012 | 1150 | NR | 600 | 20.69 | 7.62 | 0.583 | 4.09 | Water is Clear |
| 10/10/2012 | 1155 | NR | 650 | 20.78 | 7.63 | 0.583 | 3.69 | Water is Clear |
| 10/10/2012 | 1200 | NR | 700 | 20.84 | 7.65 | 0.584 | 3.20 | Water is Clear |
| 10/10/2012 | 1205 | NR | 750 | 20.71 | 7.65 | 0.587 | 3.42 | Water is Clear |
| 10/10/2012 | 1210 | NR | 800 | 20.87 | 7.65 | 0.587 | 3.01 | Pump Off; Water is Clear; Total Removed |

**Water level meter is stuck at approximately 500ft @ 1030. Unable to get water level readings.

**Was well sampled after development?** YES NO X

**Sample Method**: N/A

**Sample Name**: N/A

**Analyses**: N/A

# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Disturbed. | | Top of Cement Seal | Begin @ 1220. |
| 5 | | | | | Disturbed. | | | |
| 10 | | | | | Silty SAND (SM); dry; very loose; 70% very fine to very coarse sand; angular to subrounded; 5% gravel; 3 -8 mm; angular to subrounded; max. 10 mm; 25% silt.` | SM | | |
| 15 | | | | | Silty SAND (SM); dry; very loose; no gravel; 60% very fine to fine sand; angular to subangular; 40% silt. | | Cement Seal | |
| 20 | | | | | Silty SAND (SM); dry; very loose; 65% very fine to very coarse sand; angular to subrounded; 5% gravel; 3 - 8 mm; angular to subrounded; 30% silt. | | | End @ 1233.<br>Begin @ 1237.<br>Gravel lense. |
| 25 | | | | | Silty SAND (SM); reddish brown (2.5YR 4/4); moist; loose; no gravel; 70% very fine to coarse sand; angular to subangular; 25% silt; 5% clay; non plastic. | | | |
| 30 | | | | | | | | Increase in grain size. |

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# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Poorly graded SAND with SILT (SP-SM); red (2.5YR 4/6); moist; loose; 80% very fine to medium sand; 5% coarse to very coarse sand; angular to subrounded; 5% gravel; 3 -5 mm; angular to subangular; 10% silt. | SP-SM | Top of High Solids Bentonite Grout | Increase in grain size. |
| 35 | | | | | Poorly graded SAND with SILT (SP-SM); reddish brown (5YR 4/4); moist; loose; 75% very fine to medium sand; 5% coarse to very coarse sand; 10% gravel; 3 - 8 mm; subangular to subrounded; 10% silt. | | | End @ 1257. Replacing lower flange. Begin @ 1345. |
| 40 | | | | | Well graded SAND with SILT (SW-SM); reddish brown (2.5YR 4/4); moist; loose; 85% sand; angular to subrounded; 5% gravel; 3 - 5 mm; subangular to subrounded; 10% silt. | SW-SM | | |
| 45 | | | | | Missed collection | | | |
| 50 | | | | | Poorly graded SAND with SILT (SP-SM); reddish brown (2.5YR 4/4); moist; loose; 85% very fine to very coarse sand; angular to subrounded; 5% gravel; 3 - 10 mm; angular to subrounded; 10% silt. | SP-SM | High Solids Bentonite Grout | |
| 55 | | | | | Poorly graded SAND with SILT (SP-SM); reddish brown (2.5YR 4/4); moist; loose; 85% very fine to very coarse sand; angular to subrounded; 5% gravel; 3 - 15 mm; angular to subangular; 10% silt. | | | End @ 1400. Begin @ 1406. Gravel is primarily limestone clasts. |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); moist; loose; 92% very fine to very coarse sand; angular to subangular; 3% gravel; 3 -5 mm; angular to subangular; 5% fines. | SP | | |
| 65 | | | | | Poorly graded SAND with silt (SP-SM); reddish brown (2.5YR 4/4); moist; loose; 87% very fine to very coarse sand; angular to subrounded; 3% gravel; 3 - 5 mm; angular to subangular; 10% silt. | SP-SM | | |
| 70 | | | | | Poorly graded SAND (SP); reddish brown (5YR4/4); moist; loose; no gravel; 95% very fine to coarse sand; angular to subangular; 3% fines. | SP | - High Solids Bentonite Grout | |
| 75 | | | | | Clayey SAND (SC); red (2.5YR 4/6); moist; loose; 79% very fine to medium sand; 3% coarse to very coarse sand; 3% gravel; 3 -15 mm; angular to subangular; 15% clay; non plastic. | SC | | End @ 1430. Begin @ 1435. |
| 80 | | | | | Well graded SAND (SW); reddish brown (5YR 4/4); moist; loose; 90% sand; angular to subrounded; 5% gravel; 3 - 8 mm; angular to subrounded; 5% silt. | SW | | |
| 85 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; no gravel; 55% very fine to medium sand; 5% coarse sand; angular to subangular; 40% silt. | SM | | |
| 90 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:22 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Silty SAND (SM); reddish brown (5YR 4/4); moist; loose; 58% medium to very fine sand; 1% coarse to very coarse sand; angular to subrounded; 30% silt, 10% clay; non plastic; 1% gravel; 5 - 20 mm. | SM | | |
| 95 | | | | | Poorly graded SAND with silt (SP-SM); reddish brown (5YR 4/6); moist; loose; no gravel; 90% very fine to very coarse sand; angular to subrounded; 10% silt. | SP-SM | | End @ 1445. |
| 100 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; no gravel; 50% very fine to medium sand; angular to subangular; 50% silt. | SM | High Solids Bentonite Grout | |
| 105 | | | | | Silty SAND (SM); reddish brown (5YR 4/4); moist; loose; no gravel; 59% very fine to medium sand; 1% coarse to very coarse sand; 35% silt; 5% clay; non plastic. | SM | | |
| 110 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; no gravel; 50% very fine to medium sand; angular to subangular; 50% silt. | SM | | |
| 115 | | | | | Clayey SAND (SC); reddish brown (2.5YR 4/4); moist; loose; no gravel; 59% very fine to medium sand; 1% coarse sand; subangular to subrounded; 30% clay, 10% silt; non to low plasticity. | SC | | End @ 1502.<br>Begin @ 1508. |
| 120 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:22 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
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Project Number: 140705
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Hole Diameter Lower (in.) 9-5/8"
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At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Silty SAND (SM); reddish brown (2.5YR 4/4); moist; loose; no gravel; 59% very fine to medium sand; 1% coarse sand; angular to subrounded; 40% silt. | | | |
| 125 | | | | | Silty SAND (SM); (reddish brown (5YR 4/4); moist; loose; no gravel; 59% very fine to medium sand; 1% coarse sand; angular to subrounded; 30% silt, 10% clay; non plastic. | | | |
| 130 | | | | | Silty SAND (SM); brown (7.5YR 4/4); moist; loose; 78% very fine to medium sand; 1% coarse to very coarse; subangular to subrounded; 1% gravel; 3 - 12 mm; subangular to subrounded; 20% silt. | | | |
| 135 | | | | | Silty SAND; (SM); brown (7.5YR 4/4); moist; loose; 80%very fine to very coarse sand; angular to subrounded; 5% gravel; 3 - 12 mm; subangular to subrounded; 15% silt. | SM | High Solids Bentonite Grout | End @ 1518. Begin @ 1523. |
| 140 | | | | | Silty SAND (SM); reddish brown (5YR 4/4); moist; loose; no gravel; 60% very fine to medium sand; angular to subrounded; 40% silt. | | | |
| 145 | | | | | Silty SAND (SM); reddish brown (5YR 4/4); moist; loose; no gravel; 60% very fine to medium sand; angular to subrounded; 35% silt, 5% clay; non plastic. | | | |
| 150 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:22 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Same as above (145 ft). | SM | | |
| 155 | | | | | Clayey SAND (SC); reddish brown (5YR 4/4); moist; loose; no gravel; 59% very fine to medium sand; 1% very coarse to coarse sand; subangular to subrounded; 15% silt, 25% clay; non plastic. | SC | | End @ 1536.<br>Begin @ 1541. |
| 160 | | | | | Silty SAND (SM); reddish brown (5YR 4/4); moist; loose; no gravel; 60% very fine to medium sand; subangular to subrounded; 35% silt, 5% clay non plastic. | SM | High Solids Bentonite Grout | 1547 - clean out cyclone & cyclone hose.<br>1615 - resume drilling. |
| 165 | | | | | Clayey SAND (SC); reddish brown (5YR 4/4); moist; loose; no gravel; 60% very fine to medium sand; subangular to subrounded; 40% clay; non to low plasticity | SC | | |
| 170 | | | | | Clayey SAND (SC); reddish brown (5YR 4/4); moist; loose; no gravel; 65% very fine to medium sand; 5% very coarse to coarse sand; subangular to subrounded; 30% clay; non to low plasticity. | | | |
| 175 | | | | | Clayey SAND (SC); reddish brown (5YR 4/4); moist; loose; 58% very fine to medium sand; 1% coarse to very coarse sand; 1% gravel 3 - 15 mm; subangular to rounded; 40% clay; non to low plasticity; | | | End @ 1620.<br>Begin @ 1625. |
| 180 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:22 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Clayey SAND (SC); reddish brown (5YR 4/4); moist; loose; no gravel; 60% very fine to medium sand; subangular to rounded; 10% silt, 30% clay; non plastic. | | | |
| 185 | | | | | Same as above (180 ft). | SC | | |
| 190 | | | | | Clayey SAND (SC); reddish brown (5YR 4/4); moist; loose; no gravel; 70% very fine to medium sand; subangular to rounded; 30% clay; non plastic. | | High Solids Bentonite Grout | |
| 195 | | | | | No cuttings returned | | | Total depth with 11 3/4" casing. Begin drilling with 9 5/8". R. Daly begins logging. |
| 200 | | | | | SILT (ML); reddish brown (5YR 4/4); soft; moist; low plasticity; 90% fines; 10% fine sand; subrounded; no odor. | ML | | End of day @ 1650. Resume @ 1230 on 9/19/12. Driller adding some water. |
| 205 | | | | | No cuttings returned. | | | |
| 210 | | | | | | | | |

# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/6); loose; moist; 100% fine to coarse sand; subrounded; no odor. | SW | | |
| 215 | | | | | Same as above (210 ft). | SW | | Total depth casing @ 1248. Resume @ 1253. |
| 220 | | | | | Same as above 210 ft). | SW | | |
| 225 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 100% fine to medium sand; trace coarse sand; subrounded; no odor. | SP | High Solids Bentonite Grout | |
| 230 | | | | | Same as above (225 ft). | SP | | |
| 235 | | | | | Clayey SAND (SC); dark yellowish brown (10YR 4/4); moist; loose; 65% fine to medium sand; subrounded; 35% clay nodules; no odor. | SC | | Total depth casing @ 1304. Resume @ 1310. |
| 240 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:22 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); wet; loose; 85% fine to coarse sand; 15% gravel to 1 cm; subrounded; no odor. | SW | | |
| 245 | | | | | Lean CLAY (CL); brown (10YR 4/3); soft; wet; medium plasticity; 90% fines;10% medium sand; subrounded; no odor. | | | |
| 250 | | | | | Same as above (245 ft). | CL | | |
| 255 | | | | | Same as above (245 ft). | | High Solids Bentonite Grout | Total depth casing @ 1332. Resume @ 1355. |
| 260 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; loose; 100% fine to coarse sand; trace gravel to 1 cm; subrounded; no odor. | | | |
| 265 | | | | | Same as above (260 ft). | SW | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% fine to coarse sand; trace gravel to 1 cm; subrounded; no odor. | SW | | |
| 275 | | | | | Same as above (270 ft). | | | Total depth casing @ 1410. Resume @ 1435. |
| 280 | | | | | Same as above (270 ft). | | | |
| 285 | | | | | Same as above (270 ft). | | | |
| 290 | | | | | Same as above (270 ft); 95% fine to coarse sand; 5% gravel to 1 cm. | | High Solids Bentonite Grout | |
| 295 | | | | | Same as above (270 ft). | | | Total depth casing @ 1450. Resume @ 1525. |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% fine to coarse sand; subrounded; no odor. | SW | | |
| 305 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); dry; loose; 85% fine to coarse sand; 15% gravel to 1 cm; subrounded; no odor. | | | |
| 310 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 95% fine to medium sand; subrounded; 5% silt; no odor.<br><br>Same as above (307 ft). | SP | High Solids Bentonite Grout | |
| 315 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry;loose; 100% fine to coarse sand; subrounded; no odor. | | | Total depth @ 1543.<br>Resume @ 1550. |
| 320 | | | | | Same as above (315 ft). | SW | | |
| 325 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 100% fine to medium sand; trace coarse sand; subrounded; no odor. | SP | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | | | | |
| | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 95% fine to coarse sand; 5% gravel to 1 cm; subrounded; no odor. | SW | | |
| 335 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 100% fine to medium sand; subrounded; no odor. | SP | | Total depth @ 1610. Resume @ 1615. |
| 340 | | | | | | | | |
| | | | | | Same as above (335 ft). | | High Solids Bentonite Grout | |
| 345 | | | | | | | | |
| | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% fine to coarse sand; subrounded; no odor. | SW | | |
| 350 | | | | | | | | |
| | | | | | Same as above (345 ft). | | | |
| 355 | | | | | | | | |
| | | | | | Same as above (345 ft). | | | Total depth @ 1631. Resume @ 1640. |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 95% fine to coarse sand;subrounded; 5% gravel to 1 cm; no odor. | | | |
| 365 | | | | | Same as above (360 ft). | SW | | Pause drilling for day @ 1635. Resume @ 0835 on 9/20/12. |
| 370 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 100% fine to medium sand; trace gravel to 1.5 cm; subrounded; no odor. | SP | | |
| 375 | | | | | Well graded SAND with gravel (SW); dark yellowish brown (10YR 4/4); dry; loose; 75% fine to very coarse sand; 25% gravel to 1.5 cm; subrounded; no odor. | | High Solids Bentonite Grout | Total depth casing @ 0847. Resume @ 0856. |
| 380 | | | | | Same as above (375 ft). | SW | | Driller adding water to bring up cuttings. |
| 385 | | | | | Well graded SAND (SW); dark brown (10YR 3/3); moist; loose; 100% fine to coarse sand; no odor. | | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 100% fine to medium sand; trace coarse sand; subrounded; no odor. | | | |
| 395 | | | | | Poorly graded SAND with gravel (SP); brown (10YR 5/3); dry; loose; 85% fine to medium sand; 15% gravel to 2 cm; subrounded; no odor. | | | Total depth casing @ 0935. Resume @ 0939. |
| 400 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 95% fine to medium sand; 5% gravel to 1.5 cm; subrounded; no odor. | SP | | |
| 405 | | | | | Same as above (400 ft); gravel to 3 cm. | | | |
| 410 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); dry; loose; 95% fine to very coarse sand; 5% gravel to 1.5 cm; subrounded; no odor. | | High Solids Bentonite Grout | |
| 415 | | | | | Same as above (410 ft); 100% fine to coarse sand. | SW | | Total depth casing @ 0956. Resume @ 1100. |
| 420 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:22 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND with gravel (SW); dark yellowish brown (10YR 4/4); moist; loose; 85% fine to coarse sand; 15% gravel to 1 cm; subrounded; no odor. | | | Driller adding water. |
| 425 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% fine to coarse sand; subrounded; no odor. | SW | | |
| 430 | | | | | Same as above (425 ft). | | High Solids Bentonite Grout | |
| 435 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 95% fine to medium sand; 5% gravel to 2 cm; subrounded; no odor. | SP | | Total depth @ 1122. Resume @ 1225. |
| 440 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% fine to coarse sand; trace gravel to 1 cm; subrounded; no odor. | | | |
| 445 | | | | | Same as above (440 ft). | SW | | |
| 450 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:22 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% very fine to very coarse sand; subrounded; no odor. | | | |
| 455 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); moist; loose; 75% fine to coarse sand; 25% gravel to 3 cm; subrounded; no odor. | | | Total depth casing @ 1242. Resume @ 1319. |
| 460 | | | | | Same as above (455 ft). | | 5" Schedule 80 PVC Riser | |
| 465 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% fine to coarse sand; trace gravel to 1 cm; no odor. | SW | High Solids Bentonite Grout | |
| 470 | | | | | Same as above (465 ft). | | | |
| 475 | | | | | Same as above (465 ft). | | | Total depth casing @ 1334. Resume @ 1343. |
| 480 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:22 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 100% fine to medium sand; trace gravel to 1.5 cm; trace clay nodules; subrounded; no odor. | SP | High Solids Bentonite Grout; Top of Bentonite Seal | |
| 485 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% fine to coarse sand; subangular; no odor. | | | |
| 490 | | | | | Same as above (485 ft). | SW | Bentonite Seal | |
| 495 | | | | | Same as above (485 ft). | | | Resume @ 1400. Driller not adding water. |
| 500 | | | | | Clayey SAND (SC); brown (10YR 5/3); moist; loose; 85% fine to medium sand; subrounded; 15% clay nodules; medium plasticity; no odor. | SC | | |
| 505 | | | | | Poorly graded SAND (SP); moist; loose; 100% fine to medium sand; trace coarse sand; subrounded; no odor. | SP | | |
| 510 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:22 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
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Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 510 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); damp; loose; 100% fine to medium sand; subrounded; no odor. | SP | Bentonite Seal; Top of 20/40 Sand | |
| 515 | | | | | Same as above (510 ft). | SP | Top of 10/20 Sand; Top of 5" Schedule 80 PVC 0.010" Slot Screen | Total depth casing @ 1417. Resume @ 1423. |
| 520 | | | | | Same as above (510 ft); trace gravel to 2 cm. | SP | | |
| 525 | | | | | Well graded sand (SW); brown (10YR 5/3); wet; loose; 100% fine to coarse sand; trace gravel to 1 cm; subrounded; no odor. | SW | | Total depth casing @ 1437. Resume @ 1445. |
| 530 | | | | | Same as above (535 ft). | SW | Bottom of Screen; Sump | |
| 535 | | | | | Same as above (535 ft). | SW | Bottom of Sump | |
| 540 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:22 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106202

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 9/18/2012
Date TD Reached: 9/22/2012
Date Completed: 9/23/2012
Ground Elevation AMSL (ft): 5355.3
Y Coordinate: 1479102.15
X Coordinate: 1546604.25

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: 502.17
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/R. Daly

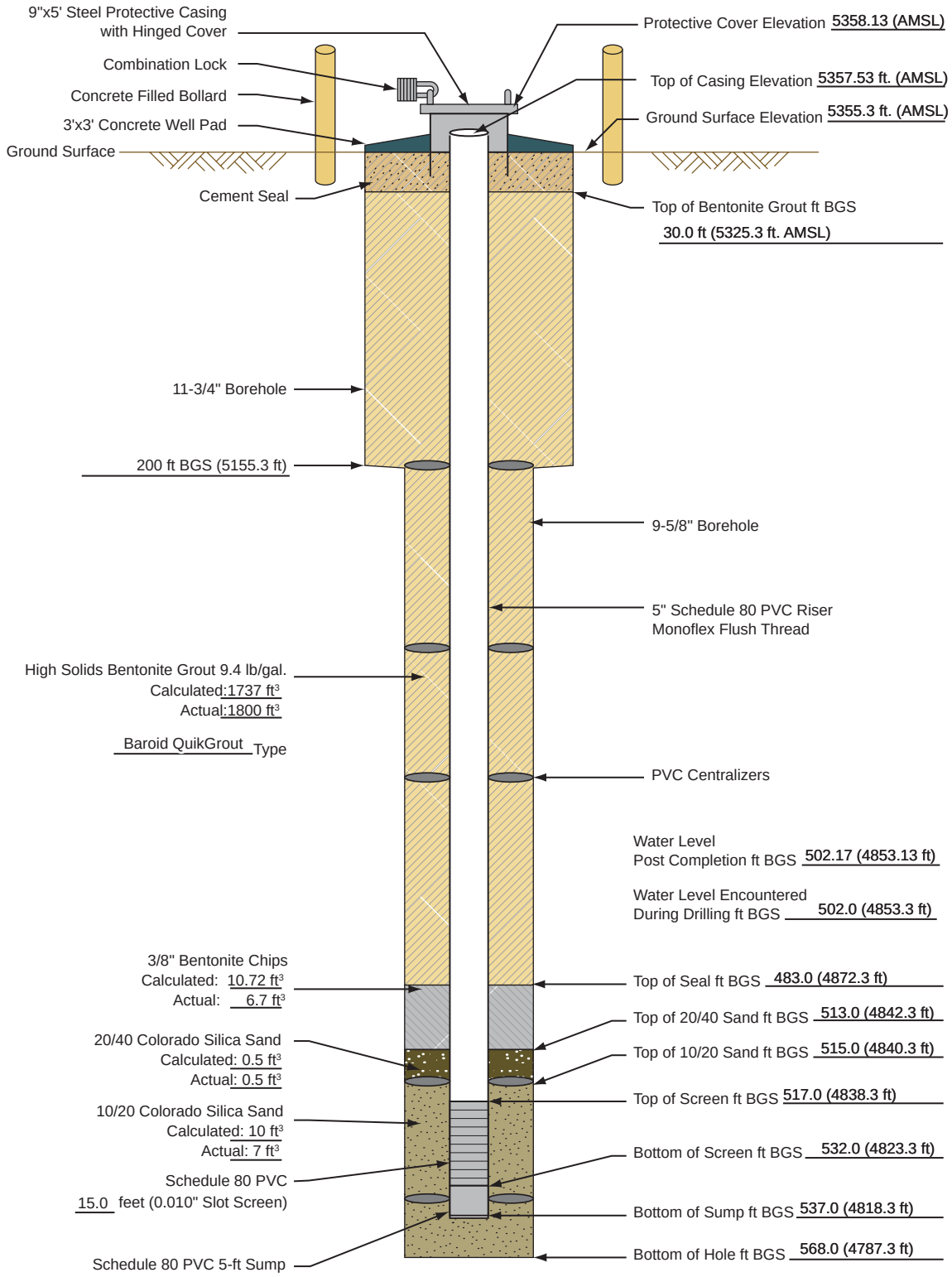


| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 540 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; loose; 95% fine to coarse sand; 5% gravel to 2 cm; subrounded; no odor. | | | |
| 545 | | | | | Same as above (540 ft). | SW | | |
| 550 | | | | | Same as above (540 ft); 90% fine to coarse sand; 10% gravel to 3 cm. | | | |
| 555 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); wet; loose; 100% fine to medium sand; trace gravel to 4 cm; subrounded; no odor. | | | Total depth of hole @ 558 ft bgs @ 1509. |
| 560 | | | | | Same as above (555 ft); 95% fine to medium sand; 5% silt. | SP | | Resume drilling @ 0821 on 9/22/12 due to heave in hole. |
| 565 | | | | | Same as above (560 ft). | | | Final Total depth of hole @ 568 ft @ 0855 on 9/22/12. |
| 570 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/19/12 11:22 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Monitoring Well Completion Diagram KAFB-106202

Installation Start Date/Time: 9/21/2012 0800
Installation End Date/Time: 9/23/2012 1500




(4,816.90) = *Elevations are NAVD 88 Datum values based on NGS Control Station "Hanger", Elevation = 5,343.43 ft. GPS/RTK methods and GEO1D99 model were used to determine elevations of all surveyed points.*

*Not to Scale*
*BGS = Below Ground Surface*

140705.CB010040_CB010133_A1

Shaw Environmental, Inc.

# Well Development Record

**Project Name**: KAFB BFF

**Location**: Near Kirtland Production Well

**Well/Piez. No.**: KAFB-106202

**Personnel**: V. Bracht

**Date Installed**: 9/23/12

**Date**: 10/9/12

**Csg. Diameter (I.D.)**: 5"

**Samplers**: N/A

**Total Depth (ft. BGL)**: 537

**Method of Development**:

X Surging X Bailing X Pumping

X Original Development ☐Redevelopment ☐Other

**Development Date**: 10/9/12

**Depth to Water Before Developing Well (ft. BGL)**: 502.85

| | | Vol. (V) | | Purge Factor | | Volume to Purge |
|---|---|---|---|---|---|---|
| **Height of Water Column**: | feet = | 47.2 | gal. * | 1 | = | 47.2 |

**V=(B * $r_c^2$ * $L_c$ * 7.48)+(B * ($r_w^2$ - $r_c^2$) * $L_s$ * $Ø_s$ * 7.48)+($H_2O$ added during drilling/installation) =** 797.20 gallons

**Depth Purging From**: 526 feet

**Time Purging Begins**: 1132, 10/9/12

**Weather**: Sunny, Warm

**Screened Interval (ft BGL)**: 517 - 537

**Equipment Nos.**: **pH Meter:** YSI36951 **EC Meter**: YSI 36951 **Turbidity Meter**: LVE003050

**Equipment Decontaminated Prior to Development**: Y X N

**Describe**: Steam Cleaned

**Collected Sample of Water Added to Well**: Y N X

**Describe**: N/A

**Comment**: 750 gallons of water added during drilling/well installation activities

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp.°C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 10/9/2012 | 1132 | 505.32 | 5 | 19.88 | 7.03 | 0.712 | >1000 | Begin Bailing; Water is Brown |
| 10/9/2012 | 1140 | - - | 15 | 19.38 | 7.94 | 0.694 | >1000 | Continue Bailing; Water is Brown |
| 10/9/2012 | 1149 | - - | 25 | 19.69 | 7.91 | 0.698 | >1000 | Continue Bailing; Water is Brown |
| 10/9/2012 | 1205 | - - | 50 | NR | NR | NR | NR | Bailed |
| 10/9/2012 | 1315 | 505.22 | - - | 28.22 | 7.95 | 0.675 | >1000 | Begin Pumping |
| 10/9/2012 | 1320 | 507.18 | 125 | 21.20 | 7.83 | 0.670 | 108.00 | Water is Cloudy |
| 10/9/2012 | 1325 | 507.33 | 175 | 21.13 | 7.83 | 0.667 | 67.10 | Water is Cloudy |
| 10/9/2012 | 1330 | 507.37 | 225 | 21.17 | 7.82 | 0.665 | 28.80 | Water is Slightly Cloudy |
| 10/9/2012 | 1335 | 507.38 | 275 | 21.18 | 7.81 | 0.665 | 23.30 | Water is Slightly Cloudy; Pump Off to Move Water Truck |
| 10/9/2012 | 1340 | 507.23 | 325 | 22.16 | 7.81 | 0.674 | 73.40 | Water is Cloudy |

Notes:
* Water Levels - Reported to the nearest 0.01 foot
* pH - Reading rounded to 0.1 pH units
* Water temperature - Reported to nearest 0.1C
* Turbidity report in NTV nearest whole #
GPM = Gallons Per Minute

Where:
B=3.14
$Ø_s$= porosity of the sand pack
$r_c$= radius of the well casing and screen in feet
$L_c$= length of water column inside the casing and screen in feet
$r_w$= radius of the well bore in feet
$L_s$= length of saturated portion of the sand pack in feet
7.48 gallons/cubic foot= conversion from cubic feet to gallons

Shaw Environmental, Inc.

# Well Development Record

**Project**: KAFB BFF

**Well No**: KAFB-106202

**Project Number**: 140705

**Samplers**: N/A

**Date**: 10/9/12

**Checked By**: N/A

**Time Start**: 1132

**Time Finish**: 1500, 10/9/12

Field Chemistry (cont'd)

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp °C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 10/9/2012 | 1420 | 507.33 | 400 | 22.06 | 7.81 | 0.669 | 17.10 | Water is Fairly Clear |
| 10/9/2012 | 1425 | 507.37 | 450 | 21.98 | 7.81 | 0.663 | 11.70 | Water is Clear |
| 10/9/2012 | 1430 | 507.39 | 500 | 21.86 | 7.82 | 0.664 | 11.90 | Water is Clear |
| 10/9/2012 | 1435 | 507.41 | 550 | 22.03 | 7.81 | 0.667 | 7.78 | Water is Clear |
| 10/9/2012 | 1440 | 507.43 | 600 | 21.98 | 7.81 | 0.667 | 8.33 | Water is Clear |
| 10/9/2012 | 1445 | 507.44 | 650 | 22.24 | 7.81 | 0.667 | 6.69 | Water is Clear |
| 10/9/2012 | 1450 | 507.45 | 700 | 22.06 | 7.81 | 0.668 | 5.24 | Water is Clear |
| 10/9/2012 | 1455 | 507.46 | 750 | 22.08 | 7.81 | 0.666 | 4.99 | Water is Clear |
| 10/9/2012 | 1500 | 507.46 | 800 | 21.94 | 7.81 | 0.667 | 3.01 | Pump Off; Water is Clear; Total Removed |

**Was well sampled after development?** YES NO X

**Sample Method**: N/A

**Sample Name**: N/A

**Analyses**: N/A

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Silty SAND (SM); brown (7.5YR 5/3); moist; very loose; 75% fine to very coarse sand; 20% silt; 5% fine gravel to 2.1 cm; subangular. | SM | Top of Cement Seal | Begin @ 0809. |
| 5 | | | | | SILT with sand (ML); light brown (7.5YR 6/4); dry; very soft; low plasticity; 75% silt; 20% very fine to very coarse sand; 5% fine gravel to 1.7 cm; subrounded. | | | |
| 10 | | | | | Same as above (3 ft.). | | | |
| 15 | | | | | Same as above (3 ft.). | ML | Cement Seal | Depth @ 0820. Resume @ 0828. |
| 20 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); dry; very soft; low plasticity; 70% silt; 30% very fine to coarse sand; 4mm; subrounded. | | | |
| 25 | | | | | SILT with gravel (ML); brown (7.5YR 5/4); dry; very soft; low plasticity; 75% silt; 20% fine gravel to 3 cm; 5% very fine to coarse sand; rounded. | | | |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Silty SAND (SM); brown (7.5YR 5/4); moist; very loose; 75% very fine to very coarse sand; 20% silt; 5% fine gravel to 1.2 cm; subrounded. | SM | Top of High Solids Bentonite Grout | |
| 35 | | | | | SILT with sand (ML); brown (7.5YR 5/4); dry; very soft; low plasticity; 75% silt; 25% very fine to very coarse sand; trace fine gravel to 1.8 cm; subrounded. | ML | | Depth @ 0853. Resume @ 0857. |
| 40 | | | | | Poorly graded SAND with gravel (SP); brown (7.5YR 5/4); dry; loose; 75% medium to very coarse sand; 25% fine gravel to 1.6 cm; subangular. | SP | | Having difficulty getting hammer to fire. |
| 45 | | | | | SILT (ML); strong brown (7.5YR 4/6); moist; loose; low plasticity; 85% silt with minor clay; 15% very fine to very coarse sand; 4 mm. | ML | | |
| 50 | | | | | Silty SAND (SM); brown (7.5YR 5/3); dry; loose; 70% very fine to very coarse sand; 30% silt; trace fine gravel to 1 cm; subrounded. | SM | | Limited cuttings returned. |
| 55 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; loose; 90% medium to very coarse sand: 10% fine gravel to 3.8 cm; subrounded. | SP | High Solids Bentonite Grout | Depth @ 0936. Resume @ 0942. |
| 60 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Silty SAND (SM); brown (7.5YR 5/4); moist; loose; 75% very fine to very coarse sand; 20% silt; 5% fine gravel to 1.1 cm. subrounded. | | | |
| 65 | | | | | Same as above (60 ft). | SM | | |
| 70 | | | | | Well graded SAND with silt (SW-SM); brown (7.5YR 5/4); dry; loose; 80% very fine to very coarse sand,10% fine gravel to 5 mm; subangular to subrounded; 10% silt. | SW-SM | | |
| | | | | | SILT with gravel (ML); strong brown (7.5YR 5/6); moist; loose; nonplastic; 75% silt; 15% fine gravel to 3.5 cm, 10% very fine to coarse sand; rounded. | | High Solids Bentonite Grout | |
| 75 | | | | | | | | Depth @ 0958. Resume @ 1005. |
| 80 | | | | | SILT (ML); strong brown (7.5YR 5/6); moist; very loose; low plasticity; 90% silt; 10% fine to medium sand; trace fine gravel to 2.5 cm; rounded. | ML | | |
| 85 | | | | | Same as above (80 ft); 15% sand. | | | |
| 90 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Same as above (80 ft); 15% very fine to coarse sand. | | | |
| 95 | | | | | Same as above (80 ft). | | | Depth @ 1017. Resume @ 1023. |
| 100 | | | | | SILT (ML); strong brown (7.5YR 5/6); dry; very soft; low plasticity; 100% silt; trace lean clay nodules; <0.08mm. | ML | | |
| 105 | | | | | Same as above (100 ft). | | High Solids Bentonite Grout | |
| 110 | | | | | Silty SAND (SM); brown (7.5YR 5/4); dry; very loose; 80% very fine to very coarse sand; 20% silt; trace fine gravel to 1 cm; subrounded. | SM | | |
| 115 | | | | | SILT (ML); strong brown (7.5YR 4/6); moist; very soft; low to medium plasticity; 85% silt; 15% very fine to medium sand; 2mm; subrounded; trace lean clay. | ML | | Depth @ 1033. Resume @ 1040. |
| 120 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Same as above (115 ft). | | | |
| 125 | | | | | SILT with sand (ML): brown (7.5YR 5/4); dry; soft; low plasticity; 75% silt; 25% very fine to very coarse sand; trace fine gravel to 1.4 cm; subrounded. | | | |
| 130 | | | | | SILT (ML); brown (7.5YR 5/4); moist; soft; low plasticity; 85% silt; 15% very fine to coarse sand; 3 mm; rounded. | | | |
| 135 | | | | | Same as above (130 ft); 10% sand; 5% fine gravel. | ML | High Solids Bentonite Grout | Depth @ 1054. Resume @ 1102. |
| 140 | | | | | Same as above (130 ft). | | | |
| 145 | | | | | Same as above (130 ft). | | | |
| 150 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Same as above (130 ft); low to medium plasticity; trace lean clay nodules. | | | |
| 155 | | | | | Same as above (130 ft). | ML | | Depth @ 1113.<br>Resume @ 1121. |
| 160 | | | | | SILT (ML); strong brown (7.5YR 5/6); dry; soft; low to non plastic; 100% silt; trace fine gravel to 1.5 cm; subrounded. | | - High Solids Bentonite Grout | 1130 - Cyclone hose is clogged.<br>Resume @ 1254. Still clogged, stop to clean hose.<br>Resume @ 1330. |
| 165 | | | | | No return | | | |
| 170 | | | | | No return. | | | |
| 175 | | | | | No return. | | | Depth @ 1335.<br>Resume @ 1344. |
| 180 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | SILT (ML); light brown (7.5YR 6/4); wet; soft; low plasticity; 80% silt; 15% fine to coarse sand; 5% lean clay; trace fine gravel to 1.6 cm; subrounded. | ML | | Adding water to prevent clogging. |
| 185 | | | | | Lean CLAY (CL); light brown (7.5YR 6/4); wet; soft; medium to high plasticity; 90% lean clay; 10% silt; trace fine gravel to 2.3 cm. | CL | | |
| 190 | | | | | Same as above (185 ft). | | High Solids Bentonite Grout | |
| 195 | | | | | SILT with sand (ML); light brown (7.5YR 6/4); wet; soft; low plasticity; 75% silt; 25% fine to very coarse sand; trace fine gravel to 1.7 cm; subangular. | ML | | Depth @ 1404. Resume @ 1427. |
| 200 | | | | | Sandy SILT (ML); light brown (7.5YR 6/4); wet; soft; non plastic; 70% silt; 30% very fine to medium sand; 2mm. | | | Total Depth @ 1433 w/11-3/4" casing. 8/31/2012 - P. Ostrye-Geologist. 0910 begin. |
| 205 | | | | | No return. | | | |
| 210 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded SAND with silt (SP-SM); reddish brown (5YR 4/4); moist; loose; no gravel; 80% fine to coarse sand; 10% very coarse sand; angular to subangular; 10% silt. | SP-SM | | |
| 215 | | | | | Silty SAND (SM); reddish brown (5YR 4/4); moist; loose; no gravel; 70% fine to medium sand, 15% coarse sand; angular to subangular; 15% silt. | SM | | End @ 0918.<br>Begin @ 0923. |
| 220 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/3); moist; loose; 5% gravel; 3 - 10 mm; subangular to subrounded to 12mm; 90% fine to very coarse sand; angular to subrounded; 5% silt. | SP | | |
| 225 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/3); moist; loose; no gravel; 95% fine to coarse sand; angular to subangular; 5% silt. | | | |
| 230 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/3); moist; loose; 5% gravel; 3 - 5 mm; subangular to subrounded to 5mm; 80% fine to coarse sand; 10% very coarse sand; angular to subangular; 5% silt. | | | |
| 235 | | | | | Same as above (230 ft). | | | End @ 0930.<br>Begin @ 0935. |
| 240 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Clayey SAND (SC); reddish brown (5YR 4/4); moist; loose; 3% gravel from 3-10 mm; subangular to subrounded; 77% fine to medium sand; 5% coarse to very coarse sand; subrounded to rounded; 15% clay; non plastic. | SC | | |
| 245 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); no gravel; 90% fine to medium sand; 5% coarse sand; angular to subrounded; 5% fines. | SP | | |
| 250 | | | | | Poorly graded SAND (SP): reddish brown (5YR 5/4); moist; loose; no gravel; 90% very fine to medium sand; 5% coarse sand; angular to subrounded; 5% fines. | SP | | Grading to SW. |
| 255 | | | | | Well graded SAND (SW); reddish brown (5YR 5/3); moist; loose; no gravel; 100% sand; angular to subrounded. | SW | High Solids Bentonite Grout | End @ 0955. Begin @ 1010. |
| 260 | | | | | Well graded SAND (SW); reddish brown (5YR 4/4); moist; loose; 5% gravel from 3 - 4 mm; subangular to subrounded; 90% sand; angular to subrounded; 5% clay; low plasticity. | SW | | Increasing grain size. |
| 265 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); moist; medium dense; 5% gravel from 3 - 10mm; subangular to subrounded; 90% very coarse to very fine sand (not well graded); angular to subrounded; 5% fines. | SP | | |
| 270 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Same as above (265 ft). | | | Decreasing grain size. |
| 275 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); moist; loose; no gravel; 90% very fine to coarse sand; 5% very coarse sand; subangular to subrounded; 5% fines. | | | End @ 1040 (See FADL). Begin @ 1210. |
| 280 | | | | | Poorly graded SAND (SP); moist; medium dense; no gravel; 92% fine to coarse sand; 3% very coarse sand; subangular to subrounded; 5% fines. | | High Solids Bentonite Grout | |
| 285 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/3); moist; medium dense; 5% gravel from 3 to 8 mm; subangular to rounded; 90% coarse to fine sand; 5% very coarse sand; subangular to subrounded. | SP | | Slow return on cuttings (sporadic). |
| 290 | | | | | Poorly graded SAND with gravel (SP); reddish brown (5YR 4/4); moist; medium dense; 30% gravel from 3 - 6 mm; subrounded to round; 65% fine to coarse sand; 5% very coarse sand: subangular to subrounded. | | | Slow return on cuttings (sporadic). |
| 295 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/3); moist (almost damp); medium dense; no gravel; 97% fine to coarse sand; 3% very coarse sand; angular to subrounded. | | | Slow return on cuttings (sporadic). End @ 1250 (cleaning hole). See FADL. |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); dry; loose; 100% very fine to fine sand; 4 mm; subrounded; trace silt nodules. | SW | | Resume @ 1432. J. Tarbert Geologist @ 300'. |
| 305 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); dry; loose; 100% very fine to medium sand; fine gravel to 2 cm; rounded; trace lean clay nodules. | SP | High Solids Bentonite Grout | |
| 310 | | | | | Same as above (305 ft); 100% very fine to fine sand. | | | |
| 315 | | | | | Same as above (305 ft); 100% very fine to fine sand. | | | Depth @ 1443. Resume @ 1448. |
| 320 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 95% fine to very coarse sand; 5% fine gravel to 9mm; rounded. | SW | | |
| 325 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; loose; 100% fine to medium sand; trace coarse sand to 3mm; rounded; trace lean clay nodules. | SP | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Same as above (325 ft); trace fine gravel to 9 mm. | SP | | |
| 335 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; medium dense; 95% fine to very coarse sand; 5% fine gravel to 7mm; rounded. | SW | | Depth @ 1456. Resume @ 1502. |
| 340 | | | | | Poorly graded SAND (SP); brown (10YR 6/3); moist; medium dense; 100% fine to medium sand; trace coarse sand to 4mm; rounded. | SP | High Solids Bentonite Grout | |
| 345 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; medium dense; 95% fine to very coarse sand; 5% fine gravel to 1 cm; subrounded to rounded. | SW | | |
| 350 | | | | | Same as above (345 ft); gravel to 2.3 cm. | | | |
| 355 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; medium dense; 100% fine to medium sand; trace coarse sand to 3mm; rounded. | SP | | Depth @ 1512. |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); moist; medium dense; 85% fine to very coarse sand; 15% fine gravel to 2.5 cm; rounded. | SW | | Resume @ 1518. Adding water to return cuttings. |
| 365 | | | | | Same as above (360 ft); gravel to 9 mm. | | | |
| 370 | | | | | Same as above (360 ft); overall finer. | | High Solids Bentonite Grout | |
| 375 | | | | | Same as above (360 ft); 60% sand; 40% gravel to 2.2 cm. | | | Depth @ 1535. End 9/4/12. Resume @ 0757 9/5/12. |
| 380 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; dense; 95% fine to very coarse sand; 5% fine gravel to 1.6 cm; rounded. | | | |
| 385 | | | | | Same as above (380 ft); coarser. | | | |
| 390 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Same as above (380 ft). | SW | | |
| 395 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); moist; dense; 85% fine to medium sand; 10% coarse sand; 5% fine gravel to 1.9 cm; rounded. | SP | | Depth @ 0817. Resume @ 0825. |
| 400 | | | | | Same as above (395 ft). | | High Solids Bentonite Grout | |
| 405 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 95% very fine to very coarse sand; 5% fine gravel to 1 cm; trace lean clay nodules. | SW | | |
| 410 | | | | | Same as above (405 ft). | | | |
| 415 | | | | | Poorly graded SAND with gravel (SP); brown (10YR 5/3); moist; dense; 80% fine to medium sand; 20% fine gravel to 2.5 cm; rounded to well rounded. | SP | | Depth @ 0840. Resume @ 0845. |
| 420 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; dense; 90% fine to medium sand; 5% coarse sand; 5% fine gravel to 9mm; rounded. | SP | | |
| 425 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; dense; 100% very fine to coarse sand; 4mm; subrounded. | SW | | |
| 430 | | | | | Same as above (425 ft); 5% fine gravel to 2.1 cm. | | | |
| 435 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); moist; dense; 80% very fine to very coarse sand; 20% fine gravel to 1.8 cm; rounded to well rounded. | | High Solids Bentonite Grout | Depth @ 0904. Resume @ 0909. |
| 440 | | | | | Same as above (435 ft); 85% sand; 15% gravel. | | | |
| 445 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; dense; 90% very fine to very coarse sand; 10% fine gravel to 1.6 cm; rounded. | | | |
| 450 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Same as above (445 ft); 5% fine gravel to 7 mm. | | | |
| 455 | | | | | Same as above (445 ft); 5% fine gravel. | SW | | Depth @ 0931. Resume @ 0937. |
| 460 | | | | | Same as above (445 ft); no gravel. | | | |
| 465 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; dense; 95% medium to coarse sand; 5% fine gravel to 9 mm; rounded. | | High Solids Bentonite Grout | |
| 470 | | | | | Same as above (465 ft). | SP | | |
| 475 | | | | | Same as above (465 ft). | | | Depth @ 0954. |
| 480 | | | | | | | Top of Bentonite Seal | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; dense; 90% fine to very coarse sand; 10% fine gravel to 1.5 cm; subrounded. | | Bentonite Seal<br>5" Schedule 80 PVC Riser | Resume @ 1001. |
| 485 | | | | | Same as above (480 ft); dry. | | | |
| 490 | | | | | Same as above (480 ft); dry. | SW | | |
| 495 | | | | | Same as above (480 ft); moist. | | Native Backfill | Depth @ 1018.<br>Resume @ 1025. |
| 500 | | | | | Poorly graded SAND (SP); light brown (7.5YR 6/4); dry; dense; 100% fine sand; trace fine gravel to 8mm; rounded. | SP | | |
| 505 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); damp; dense; 100% fine to coarse sand; trace fine gravel to 7mm; rounded. | SW | | |
| 510 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 510 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); damp; dense; 95% fine to medium sand; 5% coarse sand; 4mm; rounded. | | | |
| 515 | | | | | Same as above (510 ft); 100% fine sand; trace fine gravel to 1 cm. | SP | Bentonite Seal | Depth @ 1056. Clean out Cyclone. Resume @ 1118. |
| 520 | | | | | Poorly graded SAND with gravel (SP): brown (10YR 5/3); wet; dense; 70% fine to medium sand; 30% fine gravel to 1.2 cm; rounded. | | Native Backfill | |
| 525 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; dense; 100% fine to very coarse sand; 4.5mm; rounded. | | Bentonite Seal | |
| 530 | | | | | Same as above (525 ft); 10% gravel to 2 cm. | SW | Native Backfill | |
| 535 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); wet; dense; 70% fine to very coarse sand; 30% fine gravel to 1.5 cm; rounded. | | Bentonite Seal | Depth @ 1137. End 9/5/12. |
| 540 | | | | | | | Native Backfill | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 540 | | | | | Well graded GRAVEL with sand (GW); brown (10YR 5/3); wet; very dense; 60% fine to coarse gravel to 3.6 cm; 40% medium to coarse sand; rounded. | GW | | Resume @ 0835. |
| 545 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); wet; very dense; 90% medium to very coarse sand ; 10% fine gravel to 1.4 cm; rounded. | SP | Bentonite Seal | |
| 550 | | | | | Poorly graded SAND with gravel (SP); brown (10YR 5/3); wet; very dense; 85% medium to very coarse sand: 15% fine gravel to 1 cm; subrounded to rounded. | | Native Backfill | |
| 555 | | | | | Poorly graded SAND with SILT (SP-SM); brown (7.5YR 5/3); wet; very dense; 90% fine to medium sand; trace fine gravel to 2.8 cm; rounded; 10% silt. | SP-SM | Bentonite Seal | Added ~ 10 gal. H2O. Depth @ 0913. Resume @ 0920. |
| 560 | | | | | Silty SAND (SM); brown (7.5YR 5/3); wet; very dense; 80% fine to medium sand: trace gravel to 9mm; rounded; 20% silt. | | Native Backfill | |
| 565 | | | | | Same as above (560 ft). | SM | Bentonite Seal | 0936-king nipple detached from flange. |
| 570 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 570 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); wet; very dense; 95% medium to very coarse sand: trace fine gravel to 1.2 cm; rounded; 5% silt. | SP | Native Backfill | Resume @ 1043. |
| 575 | | | | | Silty SAND (SM); brown (7.5YR 5/3); wet; very dense; 85% medium to coarse sand; trace fine gravel to 1 cm; subrounded; 15% silt. | SM | Bentonite Seal | Depth @ 1100. Resume @ 1109. |
| 580 | | | | | Well graded SAND with gravel (SW); brown (7.5YR 5/3); wet; dense; 80% very fine to very coarse sand; 15% fine gravel to 4.4 cm; subrounded; 5% silt. | SW | Native Backfill<br>Bentonite Seal | |
| 585 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/3); wet;very dense; 90% fine to medium sand; 5% fine gravel to 2.6 cm; rounded; 5% silt. | SP | | |
| 590 | | | | | Same as above (585 ft); 85% sand; 10% fine gravel; 5% silt. | | Native Backfill | |
| 595 | | | | | Poorly graded GRAVEL with sand (GP); brown (7.5YR 5/3); wet; very dense; 70% fine gravel to 1.8 cm; rounded; 30% medium to very coarse sand: rounded. | GP | | Added ~ 50 gal H2O. Depth @ 1148. Resume @ 1254. |
| 600 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:11 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 600 | | | | | Same as above (595 ft); 80% gravel; 20% sand. | GP | | |
| 605 | | | | | Poorly graded SAND with gravel (SP); brown (10YR 5/3); wet; very dense; 60% coarse to very coarse sand; 40% fine gravel to 1.3 cm; subrounded to rounded. | SP | Native Backfill | |
| 610 | | | | | Same as above (605 ft); 70% medium coarse sand; 30% fine gravel. | | | |
| 615 | | | | | Same as above (605 ft); gravel to 4+ cm @ 617' bgs. | | Bentonite Seal<br>Top of 20/40 Sand<br>Top of 10/20 Sand | Depth @ 1326.<br>Resume @ 1337. |
| 620 | | | | | Well graded SAND with SILT (SW-SM); brown (7.5YR 5/3); wet; very dense; 85% very fine to very coarse sand: 5% fine gravel to 1 cm; rounded; 10% silt. | SW-SM | Top of 5" Schedule 80 PVC 0.010" Slot Screen | |
| 625 | | | | | Silty SAND (SM); brown (10YR 5/3); wet; very dense; 75% fine to medium sand; 5% fine gravel to 2 cm; subrounded; 20% silt. | SM | | |
| 630 | | | | | | | | |

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# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 630 | | | | | Well graded SAND with SILT (SW-SM); brown (10YR 5/3); wet; very dense; 90% fine to coarse sand; trace fine gravel to 2 cm; rounded; 10% silt. | SW-SM | Bottom of Screen<br>Sump | Added ~ 50 gal H2O.<br>Depth @ 1418.<br>Resume @ 1428. |
| 635 | | | | | Same as above (630 ft); 85% sand; 5% fine gravel; 10% silt. | | | |
| 640 | | | | | Same as above (630 ft). | | Bottom of Sump | |
| 645 | | | | | Poorly graded SAND with gravel (SP); brown (10YR 5/3); wet; very dense; 70% medium to very coarse sand: 30% fine gravel to 1.4 cm; subrounded to rounded. | SP | 10/20 Sand | |
| 650 | | | | | Well graded SAND with SILT (SW-SM); brown (10YR 5/3); wet; very dense; 90% very fine to coarse sand; trace fine gravel to 1.7 cm; rounded; 10% silt. | SW-SM | | |
| 655 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); wet; very dense; 100% medium to coarse sand; trace fine gravel to 8mm; rounded. | SP | Native Backfill | Depth @ 1510.<br>End 9/6/12. |
| 660 | | | | | | | | |

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# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 660 | | | | | Poorly graded SAND (SP); dark yellowish brown (10YR 4/4); wet; loose; 95% fine to medium sand; trace coarse sand; subrounded; 5% silt; no odor. | SP | | Resume @ 0822 on 9/7/12. Top seal on hammer broke, stop to repair. Resume on 9/09/12 @ 0859. R. Daly is geologist. |
| 665 | | | | | Well graded SAND (SW); brown (10YR 4/3); wet; loose; fine to very coarse sand; subrounded; 5% gravel to 2 cm; no odor. | SW | | |
| 670 | | | | | Same as above (665 ft). | | | |
| 675 | | | | | Same as above (665 ft). | | Native Backfill | Total Depth casing @ 0944. Resume @ 0950. |
| 680 | | | | | Well graded SAND with gravel (SW); brown (10YR 4/3); wet; loose; 80% fine to very coarse sand: 20% gravel to 3 cm; subrounded; no odor. | | | |
| 685 | | | | | Same as above (680 ft); 60% medium to very coarse sand; 40% gravel to 1 cm; subangular; no odor | | | |
| 690 | | | | | | | | |

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# Borehole ID: KAFB-106203

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/30/2012
Date TD Reached: 9/9/2012
Date Completed: 9/12/2012
Ground Elevation AMSL (ft): 5356
Y Coordinate: 1478980.00
X Coordinate: 1546600.00

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 502.00
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: J.Tarbert/P.Ostrye/R. Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 690 | | | | | Well graded SAND (SW); brown (10YR 4/3); wet; loose; 100% fine to very coarse sand; subrounded; no odor. | SW | Native Backfill | Total Depth of borehole @ 1029 @ 698'. |
| 695 | | | | | Same as above (690 ft); 90% sand; 10% gravel to 2 cm; subrounded; no odor. | | | |
| 700 | | | | | | | | |
| 705 | | | | | | | | |
| 710 | | | | | | | | |
| 715 | | | | | | | | |
| 720 | | | | | | | | |

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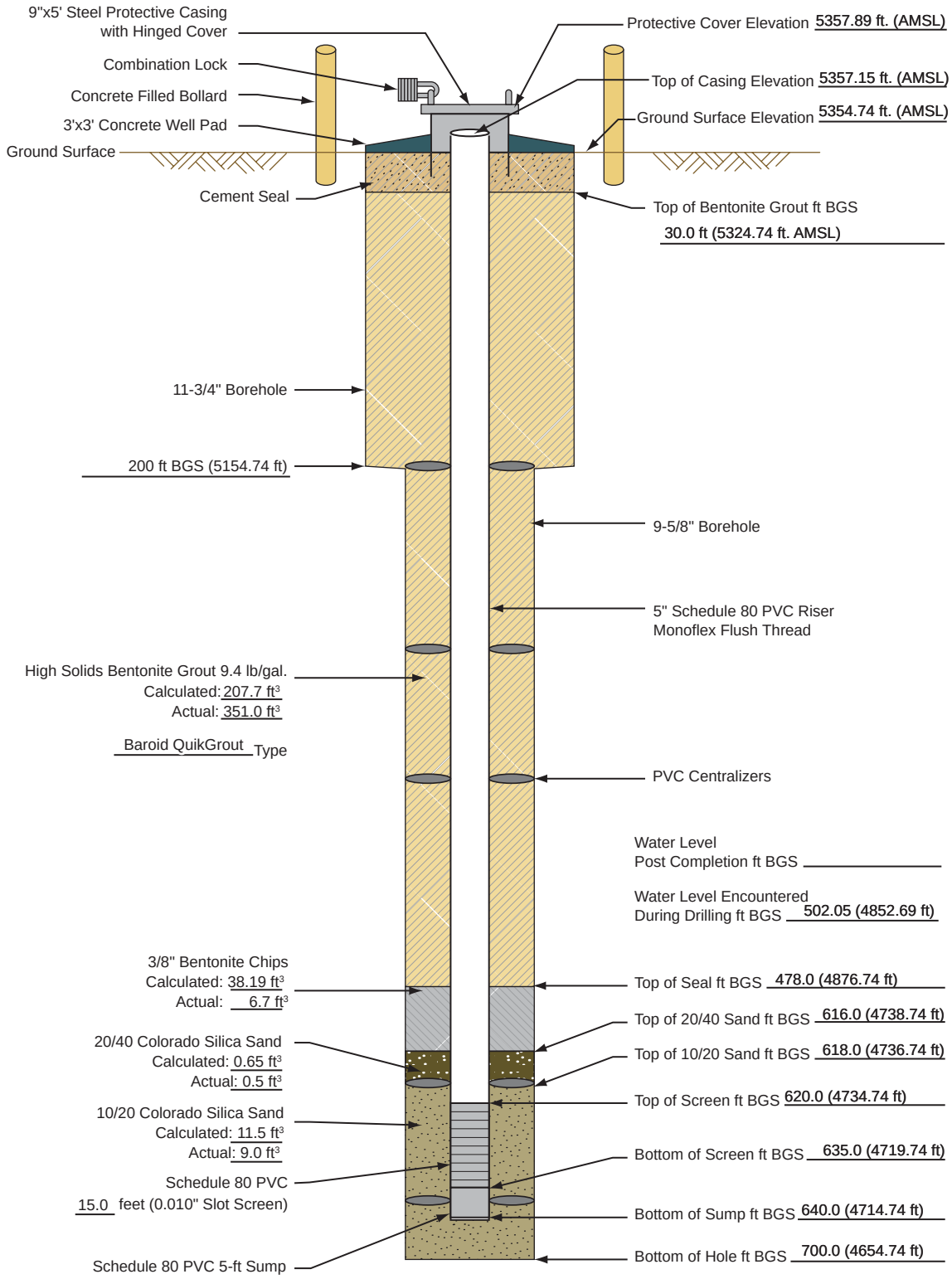
# Monitoring Well Completion Diagram KAFB-106203

Installation Start Date/Time: 9/9/2012
Installation End Date/Time: 9/9/2012




(4,816.90) = *Elevations are NAVD 88 Datum values based on NGS Control Station "Hanger", Elevation = 5,343.43 ft. GPS/RTK methods and GEO1D99 model were used to determine elevations of all surveyed points.*

*Not to Scale*
*BGS = Below Ground Surface*

140705.CB010040_CB010133.A3

Shaw Environmental, Inc.

# Well Development Record

**Project Name**: KAFB BFF

**Location**: Near Kirtland Production Well

**Well/Piez. No.**: KAFB-106203

**Personnel**: V. Bracht

**Date Installed**: 9/12/12

**Date**: 10/8/12

**Csg. Diameter (I.D.)**: 5"

**Samplers**: N/A

**Total Depth (ft. BGL)**: 640

**Method of Development**:

X Surging X Bailing X Pumping

X Original Development ☐Redevelopment ☐Other

**Development Date**: 10/8/12 - 10/9/12

**Depth to Water Before Developing Well (ft. BGL)**: 503.18

| | | Vol. (V) | | Purge Factor | | Volume to Purge |
|---|---|---|---|---|---|---|
| **Height of Water Column**: | feet = | 47.2 | gal. * | 1 | = | 47.2 |

**V=(B * $r_c^2$ * $L_c$ * 7.48)+(B * ($r_w^2$ - $r_c^2$) * $L_s$ * $Ø_s$ * 7.48)+($H_2O$ added during drilling/installation) =** 1301.97 gallons

**Depth Purging From**: 626 feet

**Time Purging Begins**: 1000, 10/8/12

**Weather**: Sunny, Warm

**Screened Interval (ft BGL)**: 620 - 635

**Equipment Nos.**: **pH Meter:** YSI36951 **EC Meter**: YSI 36951 **Turbidity Meter**: LVE003050

**Equipment Decontaminated Prior to Development**: Y X N

**Describe**: Steam Cleaned

**Collected Sample of Water Added to Well**: Y N X

**Describe**: N/A

**Comment**: 1150 gallons of water added during drilling/well installation activities

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp.°C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 10/8/2012 | 1000 | 505.68 | 5 | NR | NR | NR | >1000 | Begin Bailing; Water is Muddy |
| 10/8/2012 | 1045 | - - | 50 | NR | NR | NR | NR | Continue Bailing |
| 10/8/2012 | 1307 | 505.53 | - - | 23.53 | 8.50 | 0.593 | 345.00 | Begin Pumping at 10 GPM |
| 10/8/2012 | 1315 | 507.63 | 150 | 21.22 | 7.96 | 0.320 | 203.00 | Water is Cloudy |
| 10/8/2012 | 1325 | 507.61 | 250 | 21.44 | 7.91 | 0.316 | 144.00 | Shut off Pump to Take Water to Staging Area |
| 10/8/2012 | 1329 | - - | 275 | - - | - - | - - | - - | Resume Pumping |
| 10/8/2012 | 1443 | 507.52 | - - | 20.74 | 8.11 | 0.322 | 127.00 | Water is Slightly Cloudy |
| 10/8/2012 | 1450 | 507.52 | 375 | 21.40 | 7.97 | 0.322 | 44.70 | Water is Slightly Cloudy |
| 10/8/2012 | 1500 | 507.50 | 475 | 21.66 | 7.92 | 0.320 | 23.50 | Water is Slightly Cloudy |
| 10/8/2012 | 1508 | 507.48 | 550 | 21.72 | 7.90 | 0.323 | 20.20 | Water is Slightly Cloudy; Pump off to Move Water |

Notes:
* Water Levels - Reported to the nearest 0.01 foot
* pH - Reading rounded to 0.1 pH units
* Water temperature - Reported to nearest 0.1C
* Turbidity report in NTV nearest whole #
GPM = Gallons Per Minute

Where:
B=3.14
$Ø_s$= porosity of the sand pack
$r_c$= radius of the well casing and screen in feet
$L_c$= length of water column inside the casing and screen in feet
$r_w$= radius of the well bore in feet
$L_s$= length of saturated portion of the sand pack in feet
7.48 gallons/cubic foot= conversion from cubic feet to gallons

Shaw Environmental, Inc.

# Well Development Record

**Project**: KAFB BFF

**Well No**: KAFB-106203

**Project Number**: 140705

**Samplers**: N/A

**Date**: 10/8/12

**Checked By**: N/A

**Time Start**: 1000, 10/8/12

**Time Finish**: 0845, 10/9/12

Field Chemistry (cont'd)

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp °C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 10/8/2012 | 1540 | - - | - - | - - | - - | - - | - - | Resume Pumping |
| 10/8/2012 | 1545 | 507.46 | 600 | 21.44 | 7.91 | 0.328 | 60.20 | Water is Cloudy |
| 10/8/2012 | 1555 | 507.46 | 700 | 21.20 | 7.87 | 0.326 | 15.50 | Water is Fairly Clear |
| 10/8/2012 | 1605 | 507.46 | 825 | 21.06 | 7.85 | 0.326 | 11.20 | Water is Clear; Pump off for End of Day |
| 10/9/2012 | 0800 | 507.46 | - - | - - | - - | - - | - - | Begin Pumping |
| 10/9/2012 | 0805 | 507.63 | 900 | 19.26 | 8.09 | 0.329 | 20.60 | Water is Fairly Clear |
| 10/9/2012 | 0815 | 507.62 | 1025 | 19.53 | 7.99 | 0.329 | 0.69 | Water is Clear |
| 10/9/2012 | 0825 | 507.61 | 1125 | 19.59 | 7.96 | 0.326 | 0.47 | Water is Clear |
| 10/9/2012 | 0835 | 507.61 | 1225 | 19.70 | 7.94 | 0.330 | 0.39 | Water is Clear |
| 10/9/2012 | 0845 | 507.61 | 1325 | 19.63 | 7.94 | 0.329 | 0.43 | Pump off; Water is Clear; Total Removed |

**Was well sampled after development?** YES NO X

**Sample Method**: N/A

**Sample Name**: N/A

**Analyses**: N/A

# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
X Coordinate: 1544920.21

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | No cuttings - disturbed. | | Top of Cement Seal | Begin drilling @ 0846. |
| 5 | | | | | Lean CLAY (CL); reddish brown (5YR 4/4); moist; firm; medium plasticity; 90% clay (with some silt); 10% fine to coarse sand; no odor. | CL | | |
| 10 | | | | | SILT (ML); yellowish red (5YR 4/6); moist; soft; low to medium plasticity; 90% silt (with some clay);10% fine to medium sand; no odor. | ML | | |
| 15 | | | | | Lean CLAY (CL); (reddish brown (5YR 4/4); moist; firm; medium plasticity; 90% clay (with some silt); 10% fine sand; no odor. | CL | Cement Seal | Total depth casing @ 0905. Resume @ 0924. |
| 20 | | | | | SILT (ML); reddish brown (5YR 4/4); moist; soft; low plasticity; 90% silt; 10% coarse sand; no odor. | | | |
| 25 | | | | | Same as above (20 ft). | ML | | |
| 30 | | | | | | | | |

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# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
X Coordinate: 1544920.21

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Sandy SILT (ML); reddish brown (5YR 5/4); dry; soft; low plasticity; 60% silt; 40% fine to very coarse sand; subrounded; trace gravel to 3.5 cm; no odor. | ML | Cement Seal | |
| 35 | | | | | Silty SAND (SM); reddish brown (5YR 5/4); dry; loose; 70% fine to very coarse sand; 5% gravel to 2 cm; subangular; 25% silt; no odor. | SM | | Total depth @ 0945. Resume @ 1010. Driller adding H2O for dust suppression. |
| 40 | | | | | Sandy SILT (ML); reddish brown (5YR 5/4); dry; soft; low plasticity; 60% silt; 40% fine to very coarse sand; subrounded; trace gravel to 3.5 cm; no odor. | ML | Top of High Solids Bentonite Grout | |
| 45 | | | | | Silty SAND (SM); reddish brown (5YR 5/4); dry; loose; 70% fine to very coarse sand; 5% gravel to 2 cm; subangular; 25% silt; no odor. | SM | | |
| 50 | | | | | Well graded SAND (SW); reddish brown (5YR 5/3); wet; loose; 90% fine to very coarse sand; subangular; 5% gravel to 1 cm; 5% silt; no odor. | SW | High Solids Bentonite Grout | |
| 55 | | | | | Same as above (48 ft). | | | Total depth @ 1030. Resume @ 1045. |
| 60 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:15 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
X Coordinate: 1544920.21

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Well graded SAND with gravel (SW); pinkish gray (5YR 6/2); wet; loose; 80% medium to very coarse sand; 20% gravel to 1.5 cm; subangular; no odor. | SW | | |
| 65 | | | | | Silty SAND (ML); reddish brown (5YR 5/3); wet; loose; 70% fine to medium sand; subrounded; 30% silt; no odor. | ML | | |
| 70 | | | | | SILT (ML); reddish brown (5YR 4/4); wet; soft; low plasticity; 90% silt; 10% fine to medium sand; no odor. | ML | High Solids Bentonite Grout | |
| 75 | | | | | Well graded SAND with gravel; pinkish gray (5YR 6/2); 80% medium to very coarse sand; 20% gravel to 1.5 cm; subangular; no odor. | SW | | Total depth casing @ 1115. Resume @ 1121. |
| 80 | | | | | Sandy lean CLAY (CL); reddish brown (5YR 4/4); wet; firm; 60% clay with minor silt; 40% fine to coarse sand; subrounded; no odor. | CL | | |
| 85 | | | | | Same as above (80 ft). | | | |
| 90 | | | | | SILT (ML); reddish brown (5YR 5/3); soft; wet; low to medium plasticity; 95% silt with minor clay; 5% very fine sand; no odor. | ML | | |

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# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
X Coordinate: 1544920.21

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); reddish brown (5YR 5/3); wet; soft; low to medium plasticity ; 95% silt with minor clay; 5% very fine sand; no odor. | ML | | |
| 95 | | | | | Same as above (90 ft); significant clay content. | | | Total depth @ 1200. Resume @ 1320. |
| 100 | | | | | Same as above (90 ft). | | High Solids Bentonite Grout | |
| 105 | | | | | Same as above (90 ft). | | | |
| 110 | | | | | Same as above (90 ft). | | | |
| 115 | | | | | Same as above (90 ft). | | | Total depth @ 1340. Resume @ 1345. |
| 120 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:15 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
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Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Lean CLAY (CL); reddish brown (5YR 5/3); wet; firm; medium plasticity; 95% clay with minor silt; 5% fine sand; no odor. | | | |
| 125 | | | | | Sandy CLAY (CL); reddish brown (5YR 5/3); wet; firm; medium plasticity; 70% clay; 30% fine to coarse sand; subrounded; no odor. | | | |
| 130 | | | | | Same as above (125 ft). | | | |
| 135 | | | | | Same as above (125 ft). | CL | High Solids Bentonite Grout | Total depth casing @ 1420. Resume @ 1435. |
| 140 | | | | | Lean CLAY (CL); reddish brown (5YR 5/3); wet; soft; low to medium plasticity; 95% clay with minor silt; 5% fine sand; no odor. | | | |
| 145 | | | | | Same as above (140 ft). | | | |
| 150 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:15 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
X Coordinate: 1544920.21

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Lean CLAY (CL); reddish brown (5YR 5/3); soft; wet; low to medium plasticity; 95% clay and silt; 5% very fine sand; no odor. | | | |
| 155 | | | | | Same as above (150 ft). | CL | | Total depth @ 1500. Resume @ 1520. |
| 160 | | | | | No cuttings returned. | | High Solids Bentonite Grout | |
| 165 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); wet; loose; 100% fine to medium sand; subrounded; no odor. | | | |
| 170 | | | | | Same as above (165 ft). | SP | | |
| 175 | | | | | SILT (ML); reddish brown (5YR 5/3); soft; wet; low plasticity; 90% silt; 10% very fine sand; no odor. | ML | | Total Depth @ 1615. Resume @ 1625. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
X Coordinate: 1544920.21

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | SILT (ML); reddish brown (5YR 4/4); soft; wet; low plasticity; 90% silt; 10% fine sand; subrounded; no odor. | ML | | |
| 185 | | | | | Same as above (180 ft). | | | |
| 190 | | | | | Well graded SAND (SW); brown (10YR 4/3); wet; loose; 90% fine to very coarse sand; 5% gravel to 1.5 cm; subrounded; 5% silt. | SW | High Solids Bentonite Grout | |
| 195 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); wet; loose; 75% fine to very coarse sand; 25% gravel to 1.5 cm; subrounded; no odor. | | | Total depth @ 1655. Resume @ 1325 on 8/23/12. |
| 200 | | | | | Same as above (195 ft). | | | Total Depth with 11 3/4" casing. Begin drilling with 9 5/8" casing. |
| 205 | | | | | Same as above (195 ft); 70% fine to coarse sand; 30% gravel to 1 cm; subrounded; trace clay nodules. | | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
X Coordinate: 1544920.21

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; loose; 95% fine to medium sand; subrounded; 5% silt. | SP | | |
| 215 | | | | | Same as above (210 ft). | | | Total depth @ 1535. Resume @ 1544. |
| 220 | | | | | Well graded SAND with gravel (SW); brown (10YR 4/3); wet; loose; 60% fine to coarse sand; 40% gravel to 3.5 cm; subrounded;no odor. | SW | | |
| 225 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); wet; loose; 100% fine to medium sand; subrounded; no odor. | SP | High Solids Bentonite Grout | |
| 230 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); wet; loose; 70% fine to very coarse sand; 30% gravel to 2 cm; subrounded; no odor. | | | |
| 235 | | | | | Same as above (225 ft); 75% fine to coarse sand; 25% gravel. | SW | | Pumice present. |
| 240 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; loose; 95% fine to coarse sand; subrounded; 5% silt; no odor. | | | Total depth @ 1623. Resume @ 1615. |

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# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
X Coordinate: 1544920.21

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; loose; 100% fine to very coarse sand; trace gravel to 0.7 cm; subrounded; no odor. | SW | | |
| 245 | | | | | Same as above (240 ft). | | | |
| 250 | | | | | Same as above (240 ft). | | | |
| 255 | | | | | Same as above (240 ft). | | High Solids Bentonite Grout | Total depth @ 1630. Resume @ 1635. |
| 260 | | | | | Same as above (240 ft). | | | |
| 265 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); wet; loose; 100% fine to medium sand; subrounded; no odor. | SP | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
X Coordinate: 1544920.21

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); wet; loose; 70% fine to very coarse sand; 30% gravel to 2 cm, subrounded; no odor. | | | |
| 275 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; loose; 100% fine to coarse sand, subrounded; no odor. | SW | | Total Depth @ 1700. Resume @ 0847 on 8/24/12. |
| 280 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); wet; loose; 95% fine to medium sand, trace coarse sand, subrounded; 5% silt. | | High Solids Bentonite Grout | |
| 285 | | | | | Same as above (280 ft). | | | |
| 290 | | | | | Same as above (280 ft). | SP | | |
| 295 | | | | | Same as above (280 ft). | | | Total Depth @ 0910. Resume @ 0920. |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
X Coordinate: 1544920.21

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | | | | |
| | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; loose; 100% fine to coarse sand, subangular; no odor | SW | | |
| 305 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); brown (10YR 4/3); wet; loose; 100% fine to medium sand; trace coarse sand, subrounded. | SP | | |
| 310 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; loose; 95% fine to very coarse sand, subrounded; 5% gravel to 1.5 cm; no odor. | | High Solids Bentonite Grout | |
| 315 | | | | | Same as above (310 ft). | | | Total Depth @ 0944. Resume @ 0952. |
| 320 | | | | | Same as above (310 ft). 100% fine to coarse sand. | SW | | |
| 325 | | | | | Same as above (320 ft). | | | |
| 330 | | | | | | | | |

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# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
X Coordinate: 1544920.21

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND (SW); brown (10YR 4/3); wet; loose; 100% fine to coarse sand, subrounded; no odor. | SW | | |
| 335 | | | | | Well graded SAND with gravel (SW); brown (10YR 4/3); wet; loose; 60% fine to coarse sand; 40% gravel to 2.5 cm, subrounded; no odor | | | Total Depth @ 1011. Resume @ 1044. |
| 340 | | | | | Well graded SAND (SW); brown (10YR 4/3); wet; loose; 100% fine to coarse sand; trace gravel to 1 cm, subrounded; no odor. | | High Solids Bentonite Grout | |
| 345 | | | | | Same as above (340 ft). | | | |
| 350 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); wet; loose; 100% fine to medium sand, subrounded; no odor. | SP | | |
| 355 | | | | | Same as above (350 ft). | | | Total Depth @ 1103. Resume @ 1111. |
| 360 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:15 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
X Coordinate: 1544920.21

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; loose; 100% fine to coarse sand, subrounded; no odor. | SW | | |
| 365 | | | | | Same as above (360 ft). | | | |
| 370 | | | | | Same as above (360 ft). | | | |
| 375 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); wet; loose; 70% fine to coarse sand; 30% gravel to 3 cm; subrounded; no odor. | | High Solids Bentonite Grout | Total Depth @ 1135. Resume @ 1145. |
| 380 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; loose; 100% fine to very coarse sand, subrounded; no odor. | | | |
| 385 | | | | | Well graded GRAVEL with sand (GW); wet; loose; brown (10YR 5/3); 70% gravel to 1 cm; 30% coarse sand, subrounded. | GW | | |
| 390 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:15 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
X Coordinate: 1544920.21

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; loose; 100% fine to coarse sand, subrounded; no odor. | | | |
| 395 | | | | | Same as above (390 ft); trace gravel to 1.5 cm. | | | Total Depth @ 1215. Resume @ 0832 on 8/27/12. |
| 400 | | | | | Well graded SAND (SW); very dark grayish brown (10YR 3/2); wet; loose; 100% very fine to very coarse sand; rounded; no odor. | SW | High Solids Bentonite Grout | |
| 405 | | | | | Same as above (400 ft); dark grayish brown (10YR 4/2); subangular. | | | |
| 410 | | | | | Poorly graded SAND (SP); grayish brown (10YR 5/2); dry; loose; 100% fine to medium sand, subrounded, no odor. | | | |
| 415 | | | | | Same as above (400 ft); trace gravel to 1 cm. | SP | | Total depth @ 0910. Resume @ 0919. |
| 420 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:15 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
X Coordinate: 1544920.21

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND (SP); grayish brown (10YR 5/2); dry; loose; 95% fine to medium sand, subrounded; 5% silt; no odor. | SP | Top of Bentonite Seal | |
| 425 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 90% fine to coarse sand; 10% gravel to 1 cm, subrounded; no odor. | SW | | |
| 430 | | | | | Lean CLAY (CL); reddish brown (5YR 4/4); dry; firm; medium plasticity; 90% clay; 10% coarse sand; subrounded; no odor. | CL | | |
| 435 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); dry; loose; 95% fine to medium sand; 5% coarse sand; subrounded; no odor. | SP | | Total Depth @ 0958. Resume @ 1018. |
| 440 | | | | | Same as above (431 ft). | | | |
| 445 | | | | | Same as above (431 ft). | | | |
| | | | | | SILT (ML); reddish brown (5YR 4/4); soft; moist; low plasticity; 90% silt; 10% very fine sand; subrounded; no odor. | ML | | |
| 450 | | | | | Poorly graded SAND with silt (SP); dry; loose; 90% fine to medium sand; subrounded; 10% silt; no odor. | SP | Bentonite Seal | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:15 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
X Coordinate: 1544920.21

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 95% fine to medium sand, subrounded; 5% silt; no odor. | | | |
| 455 | | | | | Same as above (450 ft). | SP | Bentonite Seal; 5" Schedule 80 PVC Riser | Total Depth @ 1100. Resume @ 1230. |
| 460 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 100% fine to medium sand; trace coarse sand; subrounded; no odor. | | Top of 20/40 Sand; Top of 10/20 Sand; Top of 5" Schedule 80 PVC 0.010" Slot Screen | |
| 465 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); dry; loose; 100% fine to coarse sand, subrounded; no odor. | | | |
| 470 | | | | | Same as above (465 ft). | SW | | |
| 475 | | | | | Same as above (465 ft). | | | Total depth @ 1315. Resume @ 1325. |
| 480 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:15 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
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Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); dry; loose; 100% fine to very coarse sand, subrounded; trace gravel to 1 cm; no odor. | | | |
| 485 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); dry; loose; 85% fine to very coarse sand; 15% gravel to 3 cm, subrounded; no odor. | | | |
| 490 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); dry; loose; 100% fine to very coarse sand, subrounded; trace gravel to 1 cm; no odor. | SW | Bottom of Screen | Driller not adding water. Moisture from water table. |
| 495 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); moist; loose; 85% fine to very coarse sand; 15% gravel to 3 cm, subrounded; no odor. | | Sump<br>Bottom of Sump | Total Depth @ 1420. 1440 - P. Ostrye takes over as geologist. Begin advancing drive casing @ 1435. |
| 500 | | | | | No cuttings returned. | | Bottom of Filter Pack | |
| 505 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/4); wet; medium dense; 95% fine to coarse sand, subangular to subrounded; 5% fines. | SP | Native Backfill | Cuttings are sporadic. Driller adding ~ 20 gal/min of water @ 1520 to move cuttings to surface. 5 min ~ 100 gal.<br>Stop adding water. |
| 510 | | | | | | | | |

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# Borehole ID: KAFB-106204

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/22/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5331.95
Y Coordinate: 1478960.18
X Coordinate: 1544920.21

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4"
Hole Diameter Lower (in.) 9- 5/8"
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: N/A
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly/P.Ostrye



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 510 | | | | | Same as above (505 ft). | SP | | |
| 515 | | | | | Silty SAND (SM); brown (7.5YR 4/4); saturated; loose; 85% very fine to medium sand, angular to subrounded; 15% silt. | SM | Native Backfill | 1545 - Collect 4-1 L amber jars of saturated cuttings @ 513 ft bgs. |
| 520 | | | | | | | | Total depth of Borehole @ 518 ft. bgs.<br><br>1555 - Begin adding ~ 30 gal/min of water. 1600 - used 250 gallons of water. Complete setting plug. |
| 525 | | | | | | | | |
| 530 | | | | | | | | |
| 535 | | | | | | | | |
| 540 | | | | | | | | |

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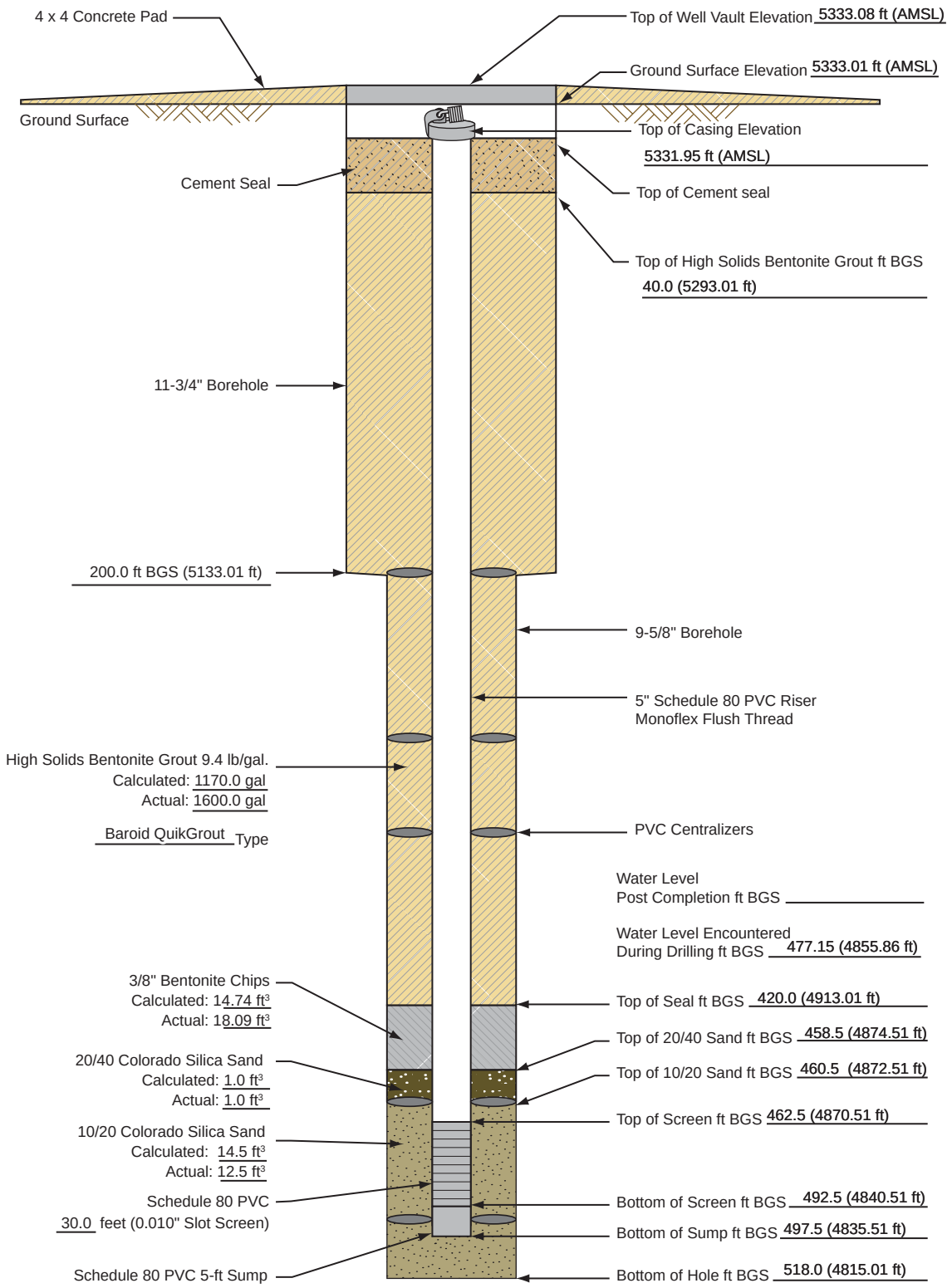
# Monitoring Well Completion Diagram KAFB-106204

Installation Start Date/Time: 8/28/2012 @ 09:00
Installation End Date/Time: 8/29/2012 @ 16:15




** Sand had to be blown out and replaced*

(4,816.90) = *Elevations are NAVD 88 Datum values based on NGS Control Station "Hanger", Elevation = 5,343.43 ft. GPS/RTK methods and GEO1D99 model were used to determine elevations of all surveyed points.*

*Not to Scale*
*BGS = Below Ground Surface*

140705.CB010132_MW_KAFB_106204

Shaw Environmental, Inc.

# Well Development Record

**Project Name**: KAFB BFF

**Location**: Kentucky and Kathryn

**Well/Piez. No.**: KAFB-106204

**Personnel**: V. Bracht

**Date Installed**: 8/29/12

**Date**: 9/17/12

**Csg. Diameter (I.D.)**: 5"

**Samplers**: N/A

**Total Depth (ft. BGL)**: 497.5

**Method of Development**:

X Surging X Bailing X Pumping

X Original Development ☐Redevelopment ☐Other

**Development Date**: 9/17/12

**Depth to Water Before Developing Well (ft. BGL)**: 477.69

| | | Vol. (V) | | Purge Factor | | Volume to Purge |
|---|---|---|---|---|---|---|
| **Height of Water Column**: | feet = | 36.65 | gal. * | 1 | = | 36.65 |

**$V=(B * r_c^2 * L_c * 7.48)+(B * (r_w^2 - r_c^2) * L_s * Ø_s * 7.48)+(H_2O$ added during drilling/installation) =** 886.65 gallons

**Depth Purging From**: 486 feet

**Time Purging Begins**: 0950, 9/17/12

**Weather**: Partly Cloudy, Cool to Warm

**Screened Interval (ft BGL)**: 462.5 - 492.5

**Equipment Nos.**: **pH Meter:** LVE 002686

**EC Meter**: LVE 002686

**Turbidity Meter**: LVE002384

**Equipment Decontaminated Prior to Development**: Y X N

**Describe**: Steam Cleaned

**Collected Sample of Water Added to Well**: Y N X

**Describe**: N/A

**Comment**: 850 gallons of water added during drilling/well installation activities

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp.°C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 9/17/2012 | 0950 | 476.99 | 15 | 20.20 | 6.26 | 0.001* | >1000 | Begin Bailing; Water is Muddy Brown |
| 9/17/2012 | 1005 | - - | 55 | 17.90 | 7.74 | 0.002* | >1000 | Continue Bailing; Water is Brown |
| 9/17/2012 | 1015 | - - | 90 | 18.90 | 7.87 | 0.002* | >1000 | Continue Bailing; Water is Brown |
| 9/17/2012 | 1020 | - - | 100 | - - | - - | - - | - - | Bailed |
| 9/17/2012 | 1125 | 476.98 | - - | 21.70 | 7.67 | 1.280 | >1000 | Begin Pumping at 10 GPM |
| 9/17/2012 | 1135 | 483.70 | 275 | 21.30 | 7.73 | 1.020 | 18.00 | Water is Fairly Clear |
| 9/17/2012 | 1145 | 484.50 | 375 | 20.80 | 7.73 | 1.000 | 25.10 | Slow Pump Down to 9 GPM |
| 9/17/2012 | 1155 | 483.45 | 475 | 21.40 | 7.71 | 1.030 | 2.50 | Water is Clear |
| 9/17/2012 | 1205 | 483.81 | 575 | 21.70 | 7.71 | 1.040 | 2.41 | Water is Clear |
| 9/17/2012 | 1215 | 484.22 | 675 | 21.50 | 7.70 | 1.060 | 8.10 | Slow Pump Down to 8 GPM |

Notes:
* Water Levels - Reported to the nearest 0.01 foot
* pH - Reading rounded to 0.1 pH units
* Water temperature - Reported to nearest 0.1C
* Turbidity report in NTV nearest whole #
GPM = Gallons Per Minute

Where:
B=3.14
$Ø_s$= porosity of the sand pack
$r_c$= radius of the well casing and screen in feet
$L_c$= length of water column inside the casing and screen in feet
$r_w$= radius of the well bore in feet
$L_s$= length of saturated portion of the sand pack in feet
7.48 gallons/cubic foot= conversion from cubic feet to gallons

Shaw Environmental, Inc.

# Well Development Record

**Project**: KAFB BFF

**Well No**: KAFB-106204

**Project Number**: 140705

**Samplers**: N/A

**Date**: 9/17/12

**Checked By**: N/A

**Time Start**: 0950, 9/17/12

**Time Finish**: 1245, 9/17/12

Field Chemistry (cont'd)

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp °C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 9/17/2012 | 1225 | 483.01 | 750 | 21.70 | 7.69 | 1.090 | 1.74 | Water is Clear |
| 9/17/2012 | 1235 | 483.15 | 825 | 21.60 | 7.69 | 1.090 | 1.84 | Water is Clear |
| 9/17/2012 | 1245 | 483.30 | 925 | 21.60 | 7.68 | 1.080 | 1.79 | Water is Clear; Pump off; Total Removed |

* Due to sample cup design, the YSI Professional Plus does not accurately measure EC from the cup. Sample cup works well in a flow-through set-up, once pumping begins.

**Was well sampled after development?** YES NO X

**Sample Method**: N/A

**Sample Name**: N/A

**Analyses**: N/A

# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | disturbed; no description | | Top of Cement Seal | 1147 Begin Drilling. |
| 5 | | | | | SILT (ML); reddish brown (5YR 4/4); soft; dry; low plasticity; 90% silt (some clay); 10% fine sand; rounded; no odor. | ML | | |
| 10 | | | | | Same as above (5 ft). | | | |
| 15 | | | | | Lean CLAY (CL); reddish brown (5YR 4/4); soft; moist; medium plasticity; 90% clay with minor silt; 10% fine sand; rounded; no odor. | CL | Cement Seal | |
| 20 | | | | | SILT (ML); reddish brown (5YR 4/4); soft; moist; low plasticity; 90% silt; 10% fine sand; subrounded; no odor. | | | Total depth casing @ 1155. Resume @ 1315. |
| 25 | | | | | SILT with sand (ML); yellowish red (5YR 4/6); soft; dry; low plasticity; 80% silt; 20% fine to coarse sand; subrounded; no odor. | ML | | |
| 30 | | | | | SILT with sand (ML); yellowish red (5YR 4/6) soft; dry; low plasticity; 75% silt w/clay nodules; 20% fine to coarse sand; 5% gravel to 2 cm. | | | |

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# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Sandy SILT (ML); reddish brown (5YR 4/4); soft; non plastic; dry; 65% silt; 25% fine to very coarse sand; subrounded; 10% gravel to 1.5 cm; no odor. | ML | Top of High Solids Bentonite Grout | |
| 35 | | | | | Well graded SAND (SW); dark reddish gray (10YR 4/2); moist; loose; 95% fine to coarse sand; 5% gravel to 1.5 cm; subrounded.<br>Same as above (32 ft). | SW | | Total depth casing @ 1330.<br>Resume @ 1347. |
| 40 | | | | | SILT (ML); reddish brown (5YR 4/4) soft; moist; low plasticity; 90% silt; 10% fine to coarse sand; no odor. | | | |
| 45 | | | | | Sandy SILT (ML); reddish gray (5YR 5/2) soft; moist; low plasticity; 70% silt; 30% fine to coarse sand; subrounded; no odor. | ML | | |
| 50 | | | | | Same as above (45 ft). | | High Solids Bentonite Grout | |
| 55 | | | | | Lean CLAY (CL); reddish brown (5YR 4/3); firm, moist; medium plasticity; 90% clay; 10% medium to coarse sand; subangular; no odor. | CL | | Total depth casing @ 1403.<br>Resume @ 1415. |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT (ML); yellowish red (5YR 4/6); soft; moist; low plasticity; 90% silt; 10% fine to medium sand; subrounded; no odor. | ML | | |
| 65 | | | | | Same as above (60ft). | | | |
| 70 | | | | | Lean CLAY (CL); yellowish red (5YR 4/6); firm; moist, medium plasticity; 90% clay with minor silt; 10% fine to medium sand; subrounded; no odor. | CL | | |
| 75 | | | | | SILT (ML); yellowish red (5YR 4/6); soft; moist; low plasticity; 90% silt; 10% fine to medium sand; subrounded; no odor. | ML | High Solids Bentonite Grout | |
| 80 | | | | | Lean CLAY (CL); yellowish red (5YR 4/6); firm; moist; medium plasticity; 90% clay; 10% fine to coarse sand; subangular; no odor. | CL | | Total depth casing @ 1433. Resume @ 0813 on 8/14/12. |
| 85 | | | | | SILT (ML); reddish brown (5YR 4/4); soft; moist; low to medium plasticity, 90% silt with minor clay; 10% fine to medium sand. | ML | | |
| 90 | | | | | Same as above (80 ft); significant amount of clay present. | | | |

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# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); reddish brown (5YR 4/4); soft; moist; low to medium plasticity; 90% silt with minor clay; 10% fine to medium sand; rounded; no odor; clay content increasing | ML | | Driller adding water. |
| 95 | | | | | Lean CLAY (CL); reddish brown (5YR 4/4); firm; medium plasticity; 85% clay with minor silt; 15% medium to coarse sand; subrounded; no odor. | CL | | Total depth casing @ 0855. Resume @ 0940. |
| 100 | | | | | No cuttings returned | | High Solids Bentonite Grout | |
| 105 | | | | | No cuttings returned | | | |
| 110 | | | | | No cuttings returned | | | |
| 115 | | | | | Lean CLAY (CL); reddish brown (5YR 4/4); firm; medium plasticity; 85% clay with minor silt; 15% medium to coarse sand; subrounded; no odor. | CL | | Total depth @ 0953 Resume @ 1000. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Lean CLAY (CL); reddish brown (5YR 4/4); firm; wet; medium plasticity; 95% clay; 5% medium to coarse sand; subangular; no odor. | CL | | |
| 125 | | | | | Same as above (120 ft) | | | |
| 130 | | | | | Same as above (120 ft) | | | |
| 135 | | | | | Same as above (120 ft) | | High Solids Bentonite Grout | Total depth casing @ 1012. Resume @ 1022. |
| 140 | | | | | Same as above (120 ft) | | | |
| 145 | | | | | No cuttings returned. | | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Sandy SILT (ML); reddish brown (5YR 5/4); soft; wet; low plasticity; 60% silt; 40% fine to very coarse sand; trace gravel to 2 cm; subangular; no odor. | ML | | |
| 155 | | | | | No cuttings returned. | | | Total depth @ 1032. Resume @ 1038. |
| 160 | | | | | No cuttings returned. | | High Solids Bentonite Grout | |
| 165 | | | | | No cuttings returned. | | | |
| 170 | | | | | Sandy SILT (ML); reddish brown (5YR 5/4); soft; wet; low plasticity; 60% silt; 40% fine to very coarse sand; trace gravel to 2 cm; subangular; no odor. | | | |
| 175 | | | | | Same as above (170 ft). | ML | | Total depth @ 1053. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | | | | |
| | | | | | Well graded SAND with gravel (SW); reddish brown (5YR 5/3); wet; loose; 80% fine to very coarse sand; subrounded; 20% gravel to 2 cm; no odor. | SW | | |
| 185 | | | | | | | | |
| | | | | | No cuttings returned. | | | |
| 190 | | | | | | | | |
| | | | | | No cuttings returned. | | High Solids Bentonite Grout | |
| 195 | | | | | | | | |
| | | | | | Well graded SAND with gravel (SW); reddish brown (5YR 5/3); wet; loose; 80% fine to very coarse sand; subrounded; 20% gravel to 2 cm; no odor. | SW | | Total depth casing @ 1120. Resume @ 1640. |
| 200 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); brown (10YR 5/4); dry; loose; 100% medium to coarse sand; subrounded; no odor. | | | Total depth with 11 3/4" casing. Begin with 9 5/8" casing. |
| 205 | | | | | Same as above (200 ft). | SP | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 100% fine to medium sand; trace gravel to 2 cm; subrounded; no odor. | SP | | |
| 215 | | | | | Same as above (210 ft). | SP | | Total depth @ 1655. End 8/14/12. Resume @ 0831 on 8/15/12. |
| 220 | | | | | Same as above (210 ft). | SP | High Solids Bentonite Grout | |
| 225 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; loose; 95% very fine to very coarse sand; subrounded; 5% silt; no odor. | SW | | |
| 230 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; loose; 100% fine to medium sand; subrounded; no odor. | SP | | |
| 235 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; loose; 95% very fine to coarse sand; subrounded; 5% silt; no odor. | SW | | Total depth @ 0825. Resume @ 0831. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; loose; 100% fine to medium sand; subrounded; no odor. | | | |
| 245 | | | | | As above (240 ft); trace coarse sand. | SP | | |
| 250 | | | | | As above (240 ft). | | | |
| 255 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); dry; loose; 80% very fine to very coarse sand; subrounded; 20% gravel to 3 cm; subrounded; no odor.<br>Same as above (252 ft). | | High Solids Bentonite Grout | Total depth casing @ 0838.<br>Resume @ 0843. |
| 260 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 10% fine to coarse sand; subrounded; no odor. | SW | | |
| 265 | | | | | Same as above (260 ft). | | | |
| 270 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:21 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; loose; 100% fine to medium sand; subrounded; no odor. | SP | | |
| 275 | | | | | Same as above (270 ft); trace gravel to 2 cm. | | | Total depth @ 0850. Resume @ 0857. |
| 280 | | | | | Same as above (270 ft). | | | |
| 285 | | | | | Same as above (270 ft). | | | |
| 290 | | | | | Same as above (270 ft). | | High Solids Bentonite Grout | |
| 295 | | | | | Same as above (270 ft). | | | Total depth @ 0904. Resume @ 0912. |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:21 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; loose; 100% fine to medium sand; subrounded; no odor. | | | |
| 305 | | | | | Poorly graded SAND with gravel (SP); brown; (10YR 4/3); dry; loose; 85% fine to medium sand; 15% gravel to 1 cm; rounded. | SP | | |
| 310 | | | | | Well graded SAND w/gravel (SW); brown (10YR 4/3); dry; loose; 80% fine to very coarse sand; 20% gravel to 3 cm; subrounded; no odor. | | | |
| | | | | | Same as above (307 ft). | SW | | |
| 315 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% fine to very coarse sand; subrounded; no odor. | | | Total depth @ 0922. Resume @ 0928. |
| 320 | | | | | Well graded GRAVEL (GW); grayish brown (10YR 5/2;) dry; loose; 90% fine gravel to 4 cm; 10% coarse sand; subrounded; no odor. | GW | | |
| 325 | | | | | Well graded SAND w/gravel (SW); brown (10YR 4/3); dry; loose; 70% fine to very coarse sand; 30% gravel to 1 cm; subrounded; no odor. | SW | | |
| 330 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; loose; 100% fine to medium sand; trace gravel to 3 cm; rounded; no odor. | SP | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:21 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND w/gravel (SW); brown (10YR 5/3); dry; loose; 60% fine to very coarse sand; 40% gravel to 3 cm; subrounded; no odor. | | | |
| 335 | | | | | As above (330 ft); 75% fine to coarse sand; 25% gravel to 3 cm. | SW | | Total depth @ 0940. Resume @ 0951. |
| 340 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 100% fine to medium sand; subrounded; no odor. | SP | High Solids Bentonite Grout | |
| 345 | | | | | Poorly graded SAND with silt (SP-SM); brown (10YR 5/3); dry; loose; 90% fine sand; subrounded; 10% silt, no odor. | SP-SM | | |
| 350 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 100% fine to medium sand; subrounded; no odor. | | | |
| 355 | | | | | Same as above (350 ft). | SP | | Total depth @ 1003. Resume @ 1011. |
| 360 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:21 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% fine to very coarse sand; subangular; no odor. | | | |
| 365 | | | | | Same as above (360 ft). | | | |
| 370 | | | | | Well graded SAND with gravel (SW); brown (10YR 4/3); dry; loose; 70% fine to very coarse sand; 30% gravel to 2 cm; no odor. | | | |
| 375 | | | | | Same as above (370 ft). | SW | High Solids Bentonite Grout | Total depth @ 1025. Resume @ 1034. |
| 380 | | | | | Same as above (370 ft). | | | |
| 385 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; loose; 100% fine to coarse sand; no odor. | | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | | | | |
| 395 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% fine to very coarse sand; subrounded; no odor. | SW | | |
| 400 | | | | | Gravelly SILT (ML); reddish brown (5YR 5/4); soft; dry; low plasticity; 60% silt; 40% gravel to 6 cm; rounded; no odor. | ML | | Total depth @ 1044. Resume @ 1250. |
| 405 | | | | | Silty SAND (SM); brown (10YR 5/3); dry; loose; 80% fine sand; subrounded; 20% silt; no odor. | SM | | |
| 410 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; loose; 95% fine to coarse sand; 5% gravel to 1 cm; subrounded; no odor. | SW | | |
| 415 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; loose; 100% fine to medium sand: no odor. | SP | High Solids Bentonite Grout | |
| 420 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; loose; 100% fine to coarse sand; trace gravel to 1 cm; subrounded; no odor. | SW | | Total depth @ 1305. Resume @ 1317. |

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# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; loose; 100% fine to coarse sand; subrounded; no odor. | SW | | |
| 425 | | | | | Same as above (420 ft). | | | |
| 430 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 95% fine to medium sand; trace coarse sand; 5% silt; no odor. Same as above (427 ft). | SP | High Solids Bentonite Grout | |
| 435 | | | | | Same as above (427 ft). | | | Total depth @ 1335. Resume @ 1345. |
| 440 | | | | | SILT (ML); reddish brown (5YR 5/4); dry; soft; low plasticity; 90% silt; 10% fine sand; subrounded; trace clay nodules; no odor. | ML | | |
| 445 | | | | | Silty SAND (SM); brown (10YR 5/3); dry; loose; 75% fine to medium sand; 25% silt; no odor. Same as above (443 ft). | SM | | |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Poorly graded SAND with silt (SP-SM); brown (10YR 5/3); dry; loose; 90% fine to medium sand; subrounded; 10% silt; no odor. | SP-SM | Top of Bentonite Seal | |
| 455 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 100% fine to medium sand; subrounded; no odor. | SP | | Total depth @ 1400. Resume @ 1408. |
| 460 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% fine to very coarse sand; subrounded; no odor. | SW | 5" Schedule 80 PVC Riser | |
| 465 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 100% fine to medium sand; subrounded; no odor. | SP | | |
| 470 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% fine to very coarse sand; subrounded; no odor. Well graded SAND with GRAVEL (SW); brown (10YR 5/3); dry: loose; 80% fine to very coarse sand; 20% gravel to 2 cm; subrounded; no odor. | SW | | |
| 475 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; loose; 100% fine to medium sand; subrounded; no odor. | SP | | Total depth @ 1424. Resume 1432. Water level @ 477.15' bgs. Water level after drilling. |
| 480 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:21 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); moist; loose; 95% fine to medium sand; 5% gravel to 2 cm; subrounded; no odor. | | | |
| 485 | | | | | Same as above (480 ft); damp. | | Top of 20/40 Sand<br>Top of 10/20 Sand | |
| 490 | | | | | Same as above (480 ft); damp; 90% sand; 10% gravel to 3 cm. | | Top of 5" Schedule 80 PVC 0.010" Slot Screen | |
| 495 | | | | | Same as above (480 ft); damp. | SP | | Total depth @ 1453.<br>Resume @ 1501. |
| 500 | | | | | Same as above (480 ft); 100% fine to medium sand. | | | |
| 505 | | | | | Same as above (500 ft). | | Bottom of Screen<br>Sump | |
| 510 | | | | | | | | |

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# Borehole ID: KAFB-106205

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/15/2012
Date TD Reached: 8/15/12
Date Completed: 8/15/2012
Ground Elevation AMSL (ft): 5333.4
Y Coordinate: 1479079.44
X Coordinate: 1544721.95

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 477.15
At End Of Drilling: N/A
After Drilling: 477.05
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly

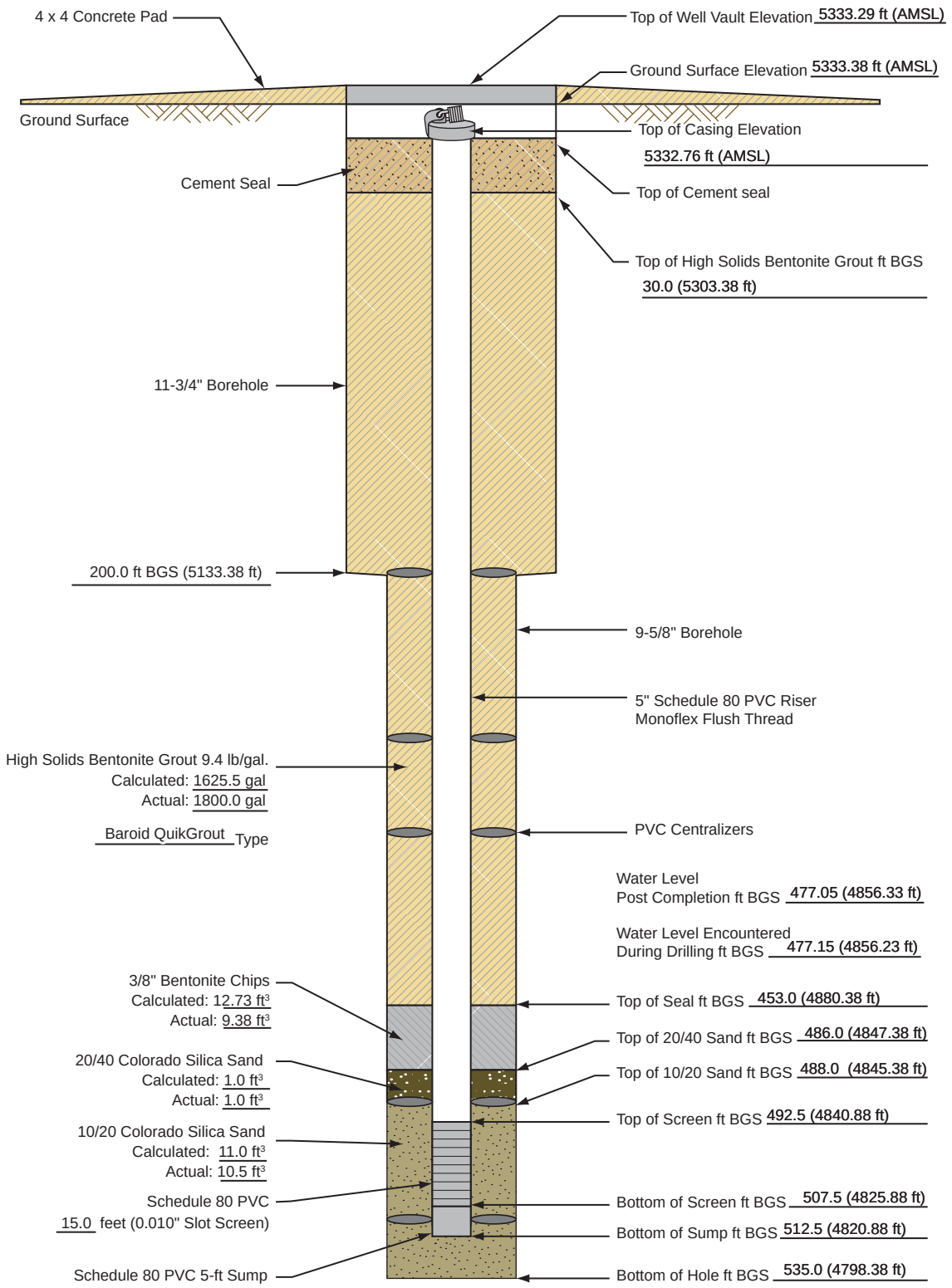


| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 510 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); damp; loose; 100% fine to medium sand; subrounded; no odor. | SP | Bottom of Sump | |
| 515 | | | | | Same as above (510 ft). | | | Total Depth @ 1517. Resume @ 1525. |
| 520 | | | | | | | Bottom of Filter Pack | |
| | | | | | Well graded SAND w/gravel (SW); brown (10YR 4/3); wet; loose; 70% medium to very coarse sand; 30% gravel to 2.5 cm; subrounded. | SW | | |
| 525 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); wet; loose; 100% fine to medium sand; subrounded; no odor. | SP | Native Backfill | |
| 530 | | | | | No recovery. | | | |
| 535 | | | | | | | | Total depth of boring @ 1540. |
| 540 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 11:21 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Monitoring Well Completion Diagram KAFB-106205

Installation Start Date/Time: 8/16/2012 @ 13:00
Installation End Date/Time: 8/21/2012 @ 11:00




** Sand had to be blown out and replaced*

(4,816.90) = *Elevations are NAVD 88 Datum values based on NGS Control Station "Hanger", Elevation = 5,343.43 ft. GPS/RTK methods and GEO1D99 model were used to determine elevations of all surveyed points.*

*Not to Scale*
*BGS = Below Ground Surface*

140705.CB010132_MW_KAFB_106205

Shaw Environmental, Inc.

# Well Development Record

**Project Name**: KAFB BFF

**Location**: Kentucky and Kathryn

**Well/Piez. No.**: KAFB-106205

**Personnel**: V. Bracht

**Date Installed**: 8/21/12

**Date**: 9/14/12

**Csg. Diameter (I.D.)**: 5"

**Samplers**: N/A

**Total Depth (ft. BGL)**: 512.5

**Method of Development**:

X Surging X Bailing X Pumping

X Original Development ☐Redevelopment ☐Other

**Development Date**: 9/14/12

**Depth to Water Before Developing Well (ft. BGL)**: 478.52

| | Vol. (V) | | Purge Factor | | Volume to Purge |
|---|---|---|---|---|---|
| **Height of Water Column**: feet = | 51.21 | gal. * | 1 | = | 51.21 |

**V=(B * $r_c^2$ * $L_c$ * 7.48)+(B * ($r_w^2$ - $r_c^2$) * $L_s$ * $Ø_s$ * 7.48)+($H_2O$ added during drilling/installation) =** 801.21 gallons

**Depth Purging From**: 506 feet

**Time Purging Begins**: 0855, 9/14/12

**Weather**: Partly Cloudy, Cool

**Screened Interval (ft BGL)**: 492.5 - 507.5

**Equipment Nos.**: **pH Meter:** LVE 002686 **EC Meter**: LVE 002686 **Turbidity Meter**: LVE002384

**Equipment Decontaminated Prior to Development**: Y X N

**Describe**: Steam Cleaned

**Collected Sample of Water Added to Well**: Y N X

**Describe**: N/A

**Comment**: 750 gallons of water added during drilling/well installation activities

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp.°C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 9/14/2012 | 0855 | 477.72 | 20 | 17.90 | 6.52 | NR* | >1000 | Begin Bailing; Water is Muddy Brown |
| 9/14/2012 | 0908 | - - | 55 | 18.20 | 7.65 | NR* | >1000 | Continue Bailing; Water is Muddy Brown |
| 9/14/2012 | 0923 | - - | 100 | 17.80 | 7.79 | NR* | >1000 | Continue Bailing; Water is Brown |
| 9/14/2012 | 1032 | 477.74 | - - | 19.40 | 7.54 | 0.434 | >1000 | Begin Pumping at 10 GPM |
| 9/14/2012 | 1035 | 479.95 | 175 | 19.90 | 7.64 | 0.432 | 123.00 | Water is Fairly Clear |
| 9/14/2012 | 1045 | 479.99 | 275 | 20.30 | 7.68 | 0.422 | 23.80 | Water is Fairly Clear |
| 9/14/2012 | 1055 | 480.02 | 375 | 20.30 | 7.72 | 0.420 | 19.70 | Water is Fairly Clear |
| 9/14/2012 | 1105 | 480.05 | 475 | 20.50 | 7.72 | 0.420 | 9.74 | Water is Clear |
| 9/14/2012 | 1115 | 479.99 | 575 | 20.60 | 7.72 | 0.418 | 18.30 | Water is Fairly Clear |
| 9/14/2012 | 1125 | 480.05 | 675 | 20.60 | 7.72 | 0.416 | 5.77 | Water is Clear |

Notes:
* Water Levels - Reported to the nearest 0.01 foot
* pH - Reading rounded to 0.1 pH units
* Water temperature - Reported to nearest 0.1C
* Turbidity report in NTV nearest whole #
GPM = Gallons Per Minute

Where:
B=3.14
$Ø_s$= porosity of the sand pack
$r_c$= radius of the well casing and screen in feet
$L_c$= length of water column inside the casing and screen in feet
$r_w$= radius of the well bore in feet
$L_s$= length of saturated portion of the sand pack in feet
7.48 gallons/cubic foot= conversion from cubic feet to gallons

Shaw Environmental, Inc.

# Well Development Record

**Project**: KAFB BFF

**Well No**: KAFB-106205

**Project Number**: 140705

**Samplers**: N/A

**Date**: 9/14/12

**Checked By**: N/A

**Time Start**: 0855, 9/14/12

**Time Finish**: 1145, 9/14/12

Field Chemistry (cont'd)

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp °C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 9/14/2012 | 1135 | 480.10 | 775 | 20.50 | 7.74 | 0.431 | 4.41 | Water is Clear |
| 9/14/2012 | 1145 | 480.11 | 875 | 20.50 | 7.75 | 0.429 | 3.38 | Water is Clear; Pump off; Total Removed |

* Due to sample cup design, the YSI Professional Plus does not accurately measure EC from the cup. Sample cup works well in a flow-through set-up, once pumping begins.

**Was well sampled after development?** YES NO X

**Sample Method**: N/A

**Sample Name**: N/A

**Analyses**: N/A

# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Disturbed from potholing | | Top of Cement Seal | 1542 Begin drilling. |
| 5 | | | | | SILT with sand (ML); yellowish red (5YR 5/6); soft, dry, low plasticity; 80% silt; 20%very fine to coarse sand; no odor. | ML | | |
| 10 | | | | | Same as above (5 ft); 75% silt; 25% fine to coarse sand. | | | |
| 15 | | | | | Same as above (5 ft); trace gravel to 2 cm | | Cement Seal | Total Depth Casing @ 1600. |
| 20 | | | | | Well graded SAND (SW); light reddish brown (5YR 6/3); dry; soft; no plasticity; 95% fine to very coarse sand, 5% silt; no odor. | SW | | |
| 25 | | | | | Well graded SAND with silt (SW-SM); reddish brown (5YR 5/4); dry; loose; 90% very fine to very coarse sand; trace gravel to 2 cm; 10% silt; no odor. | SW-SM | | |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:28 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Well graded SAND with gravel (SW); dry; loose; 80% very fine to very coarse sand; 20% gravel to 2.5 cm. | | Cement Seal | |
| 35 | | | | | Same as above (30 ft). | SW | Top of High Solids Bentonite Grout | Total Depth Casing @ 1630. Resume Drilling @ 0815 on 7/17/12. |
| 40 | | | | | SILT (ML); yellowish red (5YR 4/6) soft; dry; low plasticity; 90% silt; 10% fine to very coarse sand; trace gravel to 1.5 cm. | ML | | |
| 45 | | | | | Well graded SAND (SW); yellowish red (5YR 4/6); dry; loose; 95% fine to very coarse sand; 5% gravel to 1 cm; no odor. | SW | | |
| 50 | | | | | Same as above (45 ft); 90% medium to very coarse sand; 10% gravel to 2 cm. | | High Solids Bentonite Grout | |
| 55 | | | | | Lean CLAY (CL); yellowish red (5YR 4/6); firm, moist; medium plasticity; 95% clay; 5%; fine to medium sand; no odor. | CL | | |
| 60 | | | | | SILT (ML); yellowish red (5YR 5/6); soft; moist; low plasticity; 95% silt; 5% very fine sand; no odor. | ML | | Total Depth Casing @ 0835. Resume @ 0843. |

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# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | SILT with sand (ML); reddish brown (5YR 4/4); soft; dry; low plasticity; 80% silt; 20% fine to medium sand; no odor. | | | |
| 65 | | | | | SILT (ML); reddish brown (5YR 5/4); soft; moist; low plasticity; 95% silt; 5% very fine sand; no odor. | | | |
| 70 | | | | | Same as above (65 ft). | | High Solids Bentonite Grout | |
| 75 | | | | | Same as above (65 ft); 90% silt with minor clay; 10% fine to medium sand. | ML | | Total Depth @ 0920<br>Resume @ 0926. |
| 80 | | | | | Same as above (75 ft). | | | |
| 85 | | | | | Same as above (75 ft). | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); reddish brown (5YR 5/4); soft; dry; low plasticity, 90% silt; 10% fine to medium sand; trace coarse sand to 0.5 cm; no odor. | | | |
| 95 | | | | | Same as above (90 ft). | | | Total Depth @ 0955<br>Resume @ 1051. |
| 100 | | | | | Sandy SILT (ML); reddish brown (5YR 4/4); soft; dry; low plasticity; 70% silt; 30% fine to coarse sand; no odor. | | High Solids Bentonite Grout | |
| 105 | | | | | SILT (ML); yellowish red (5YR 4/6); soft; dry; low plasticity; 90% silt; 10% fine sand; no odor. | ML | | |
| 110 | | | | | Same as above (105 ft); 10% fine to medium sand. | | | |
| 115 | | | | | Same as above (105 ft); 95% silt; 5% very fine sand. | | | Total Depth @ 1109<br>Resume @ 1118. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | No cuttings returned. | | | |
| 125 | | | | | Sandy SILT (ML); light reddish brown (5YR 6/4); soft; (wet/saturated) low to medium plasticity; 70% silt with minor clay; 30% fine to coarse sand. | ML | | Driller begins adding water. Cuttings saturated. |
| 130 | | | | | SILT ( ML); light reddish brown (5YR 6/4); soft; low plasticity; 90% silt; 10% fine sand; no odor. | | | |
| 135 | | | | | Same as above (130 ft). | | High Solids Bentonite Grout | Total Depth@1140. End 7/17/12. Resume @ 1230 on 7/18/12. |
| 140 | | | | | SILT with sand (ML); light reddish brown (5YR 6/4); soft; saturated; low to medium plasticity; 75% silt with minor clay; 25% fine to medium sand; no odor. | | | Driller adding water. Cuttings saturated. Extremely difficult to log accurately. |
| 145 | | | | | SILT (ML); light reddish brown (5YR 6/4); soft; low plasticity; 95% silt; 5% fine sand. | | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | SILT (ML); light reddish brown (5YR 6/4); soft; low plasticity; 95% silt; 5% very fine sand; no odor. | | | Cuttings saturated. |
| 155 | | | | | Same as above (150 ft). | ML | | Total Depth @ 1245. Resume @ 1355. |
| 160 | | | | | No cuttings returned. | | High Solids Bentonite Grout | |
| 165 | | | | | No cuttings returned. | | | |
| 170 | | | | | Poorly graded SAND (SP); light yellowish brown (10YR 6/4); loose; 90% fine to medium sand; 5% silt; no odor. | | | |
| 175 | | | | | Same as above (170 ft). | SP | | Total Depth @ 1315. Resume @ 1325. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | Lean CLAY with sand (CL); dark yellowish brown (10YR 4/4); firm; medium plasticity; 80% clay with minor silt; 20% medium to coarse sand; no odor. | CL | | |
| 185 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); loose; 90% fine to coarse sand; 10% silt. Same as above (183 ft). | SW | | |
| 190 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); loose; 70% sand; medium to very coarse gravel to 3 cm; no odor. | | High Solids Bentonite Grout | |
| 195 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); loose; 95% fine to medium sand; 5% silt; no odor. | SP | | Total depth @ 1345. |
| 200 | | | | | Well graded SAND (SW); brown (10YR 5/3); loose; 90% fine to very coarse sand; 10% gravel to 2 cm; no odor. | | | @200ft switch to 9 5/8" casing. |
| 205 | | | | | Same as above (200 ft); 100% fine to coarse sand. | SW | | Resume drilling 7-23-12 @ 1435. |
| 210 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:28 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND (SW); dark yellowish brown (10YR 4/4); moist; loose; 100% very fine to coarse sand; no odor. | SW | | |
| 215 | | | | | Same as above (210 ft); 100% very fine to medium sand; trace coarse sands. | | | Total Depth casing @ 14:50. Resume drilling @ 1500. |
| 220 | | | | | Same as above (210 ft); dry; 95% fine to very coarse sand; 5% gravel to 3 cm. | | | |
| 225 | | | | | Same as above (210 ft); 90% fine to medium sand; 10% coarse sands. | | High Solids Bentonite Grout | |
| 230 | | | | | Same as above (210 ft). | | | |
| 235 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/2); dry; loose; 100% very fine to medium sand; no odor. | SP | | Total Depth casing @ 1515. Resume drilling @ 1520. |
| 240 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:28 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); loose; dry; 95% fine to medium sand; 5% silt; no odor. | SP | | |
| 245 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% fine to coarse sand; no odor. | SW | | |
| 250 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); loose; dry; 95% fine to medium sand; 5% silt; no odor. | SP | | |
| 255 | | | | | Well graded SAND with gravel (SW); grayish brown (10YR 5/2); dry; loose; 85% fine to very coarse sand; 15% gravel to 1 cm; no odor. | SW | High Solids Bentonite Grout | Total Depth casing @ 1530. Resume @ 1537. |
| 260 | | | | | As above (254 ft). | | | |
| 265 | | | | | Poorly graded SAND (SP); light yellowish brown (10YR 6/4); dry; loose; 95% fine to medium sand; 5% silt; no odor. | SP | | |
| 270 | | | | | | | | |

# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND (SP) pale brown (10YR 6/3) dry; loose; 95% fine to medium sand; 5% silt; no odor. | | | |
| 275 | | | | | Same as above (270 ft). | | | Total Depth casing @ 1550. Resume @ 1558. |
| 280 | | | | | Same as above (270 ft). | SP | | |
| 285 | | | | | Same as above (270 ft); large (5 to 6 cm) chunks of lean clay entrained; trace gravel to 1.5 cm. | | | |
| 290 | | | | | | | High Solids Bentonite Grout | |
| | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); dry; loose; 100% fine to coarse sand; no odor. | | | |
| 295 | | | | | Same as above (291 ft). | SW | | Total Depth casing @ 1610. Resume @ 1620. |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:28 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% fine to coarse sand; no odor. | SW | | |
| 305 | | | | | Same as above (300 ft). | SW | | |
| 310 | | | | | Same as above (300 ft). | SW | High Solids Bentonite Grout | |
| 315 | | | | | Same as above (300 ft); trace gravel to 2 cm. | SW | | 1630 shut down for lightning. Resume @ 0830 on 7-24-12. |
| 320 | | | | | Well graded SAND with gravel (SW); grayish brown (10YR 5/2); dry; loose; 70% fine to very coarse sand; 30% gravel to 4 cm. | SW | | |
| 325 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/3); dry; loose; 90% fine to medium sand; 10% gravel to 2 cm. | SP | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:28 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
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Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
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Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); dry; loose; 90% very fine to very coarse sand; 10% gravel to 1 cm; no odor. | | | |
| 335 | | | | | Same as above (330 ft); 95% fine to very coarse sand; 5% gravel to 0.8 cm. | SW | | Total Depth casing @ 0845. Resume @ 0850. |
| 340 | | | | | Same as above (330 ft); 70% fine to medium sand; 30% coarse sands; trace gravel to 1.5 cm; no odor. | | | |
| 345 | | | | | Well graded GRAVEL (GW); brown (10YR 5/3); dry; loose; 90% gravel to 3 cm; 10% medium sand; no odor. | GW | High Solids Bentonite Grout | |
| 350 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); dry; loose; 100% fine to medium sand; trace gravel to 7 cm. Same as above (345 ft); 95% fine to medium sand; 5% silt; no odor. | SP | | |
| 355 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 95% fine to coarse sand; 5% gravel to 1 cm; no odor. | SW | | Total Depth casing @ 0905. Resume @ 0915. |
| 360 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:28 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
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Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 100% fine to medium sand; trace coarse sand; no odor. | SP | | |
| 365 | | | | | Same as above (360 ft). | | | |
| | | | | | Well graded SAND (SW); brown (10YR 4/3); moist; loose; 95% fine to very coarse sand; 5% gravel to 0.8 cm; no odor. | SW | | |
| 370 | | | | | Same as above (367 ft). | | | |
| 375 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); moist; loose; 100% fine to medium sand; no odor. | SP | High Solids Bentonite Grout | Total Depth casing @ 0930. Resume @ 0940. |
| 380 | | | | | Same as above (374 ft). | | | |
| 385 | | | | | Well graded SAND (SW); brown (10YR 4/3); dry; loose; 100% fine to very coarse sand; trace gravel to 1 cm; no odor | SW | | |
| 390 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:28 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Poorly graded SAND (SP); brown (10YR 4/3); dry; loose; 95% fine to medium sand; 5% coarse sands; no odor. | | | |
| 395 | | | | | Same as above (390 ft). | SP | | Total Depth casing @ 1010.<br>Resume @ 1245. |
| 400 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose 100% fine to very coarse sand; trace gravel to 1 cm; no odor. | | | |
| 405 | | | | | Same as above (400 ft). | | | |
| 410 | | | | | Same as above (400 ft); 95% fine to very coarse sand: 5% gravel to 3 cm; no odor. | SW | High Solids Bentonite Grout | |
| 415 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); dry; loose; 100% fine to medium sand; trace coarse sands; no odor. | SP | | Total Depth casing @ 1310.<br>Resume @ 1320. |
| 420 | | | | | | | | |

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# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); dry; loose; 100% fine to coarse sand; no odor. | SW | | |
| 425 | | | | | Same as above (420 ft). | | | |
| 430 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); dry; loose; 100% fine to medium sand; trace coarse; no odor. | SP | High Solids Bentonite Grout | |
| 435 | | | | | Same as above (430 ft); no coarse sand. | | | Total Depth casing @ 1345. Resume @ 1351. |
| 440 | | | | | Same as above (430 ft); 100% fine to medium sand. | | | |
| 445 | | | | | Same as above (440 ft). | | | |
| 450 | | | | | | | | |

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# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 95% fine to medium sand; 5% silt; no odor. | | | |
| 455 | | | | | Same as above (450 ft). | SP | | Total Depth @ 1425. Resume @ 1438. |
| 460 | | | | | Same as above (450 ft). | | 5" Schedule 80 PVC Riser | |
| | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; loose; 100% very fine to very coarse sand; no odor. | | | |
| 465 | | | | | Same as above (450 ft). | | High Solids Bentonite Grout | |
| 470 | | | | | Same as above (450 ft). | SW | | |
| 475 | | | | | Same as above (450 ft). | | Top of Bentonite Seal | Total Depth @ 1510. Resume @ 1520. |
| | | | | | | | | Water level after drilling. |
| 480 | | | | | | | | Water level at time of drilling. |

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# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; loose; 100% fine to medium sand; trace coarse sands; no odor. | | | |
| 485 | | | | | Same as above (480 ft). | SP | | |
| 490 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% fine to very coarse sand; no odor. | | Bentonite Seal | |
| 495 | | | | | Same as above (490 ft); cuttings increasingly moist until damp at ~493 feet; at water table. | | | Total Depth casing @ 1605. Resume @ 1320 on 7/25/12. |
| 500 | | | | | Same as above (490 ft); damp. | SW | | |
| 505 | | | | | Same as above (490 ft). | | | |
| 510 | | | | | | | | |

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# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 510 | | | | | Well graded SAND (SW); brown (10YR 5/3); damp; loose; 100% fine to very coarse sand; no odor. | | | |
| 515 | | | | | Same as above (510 ft). | | | Total Depth casing @ 1412.<br>Resume @ 1445. |
| 520 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); damp; loose; 80% fine to very coarse sand; 20% fine gravel to 5 cm; no odor. | | | |
| 525 | | | | | Same as above (520 ft); gravel to 1 cm; gravel decreasing in size. | SW | | |
| 530 | | | | | Well graded SAND (SW); brown (10YR 5/3); damp; loose; 95% fine to coarse sand; 5% gravel to 0.8 cm; no odor. | | | |
| 535 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); damp; loose; 85% fine to very coarse sand; 15% gravel to 1 cm; no odor. | | Bentonite Seal | Total Depth casing @ 1520.<br>Resume @ 0925 on 7-26-12. |
| 540 | | | | | | | | |

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# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 540 | | | | | No cuttings returned. | | | |
| 545 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); damp; loose; 95% fine to very coarse sand; 5% gravel to 1.5 cm; no odor; subangular. | | | |
| 550 | | | | | Same as above (545 ft); wet. | | | |
| 555 | | | | | Well graded SAND with gravel (SW); dark grayish brown (10YR 4/2); wet; loose; 65% fine to coarse sand; 35% gravel to 1.5 cm; subrounded; no odor. | SW | | Total Depth casing @ 1033. Resume @ 1040. |
| 560 | | | | | Same as above (556 ft); 15% gravel to 2 cm; subrounded; 85% fine to very coarse sand. | | Bentonite Seal | |
| 565 | | | | | Same as above (560 ft). | | | |
| 570 | | | | | | | | |

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# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 570 | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); wet; loose; 95% fine to coarse sand; 5% gravel to 3 cm; subrounded; no odor. | SW | Bentonite Seal | |
| 575 | | | | | Same as above (570 ft). | | | At 575 ft, Total Depth casing @ 1240. Resume @ 0855. |
| 580 | | | | | Poorly graded SAND (SP); dark grayish brown (10YR 4/2); wet; loose; 100% fine to medium sand; trace coarse sand; no odor; subrounded. | SP | | |
| | | | | | Well graded SAND (SW); dark grayish brown (10YR 4/2); wet; loose; 95% medium to very coarse sand; 5% gravel to 2 cm; no odor; subangular. | | | |
| 585 | | | | | Same as above (580 ft). | | | |
| 590 | | | | | Same as above (580 ft); 95% fine to very coarse sand; 5% gravel to 2 cm. | SW | Top of 20/40 Sand<br>Top of 10/20 Sand<br>Top of 5" Schedule 80 PVC 0.010" Slot Screen | |
| 595 | | | | | Same as above (580 ft); 100% fine to coarse sand; trace gravel. | | | Total Depth casing @ 0935. Resume @ 1005. |
| 600 | | | | | | | | |

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# Borehole ID: KAFB-106206

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/16/2012
Date TD Reached: 7/16/2012
Date Completed: 7/16/2012
Ground Elevation AMSL (ft): 5333.7
Y Coordinate: 1479144.25
X Coordinate: 1544723.57

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9- 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 478.50
At End Of Drilling: N/A
After Drilling: 477.15
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Rachel Daly



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 600 | | | | | No cuttings returned. | | | |
| 605 | | | | | Well graded SAND (SW); brown (10YR 4/3); wet; loose; 100% medium to very coarse sand; trace gravel to 2 cm; subrounded; no odor. | SW | Bottom of Screen | |
| 610 | | | | | Same as above (603 ft); trace clay nodules. | | Sump | |
| 615 | | | | | Same as above (610 ft). | | Bottom of Sump | Total Depth casing @ 1050.<br>Resume @ 1148. |
| 620 | | | | | Well graded SAND with gravel (SW); brown (10YR 4/3); wet; loose; 70% fine to very coarse sand; 30% gravel to 2 cm; no odor; subrounded. | | | |
| 625 | | | | | Same as above (620 ft). | | | Total Depth Borehole @ 1210. |
| 630 | | | | | | | | |

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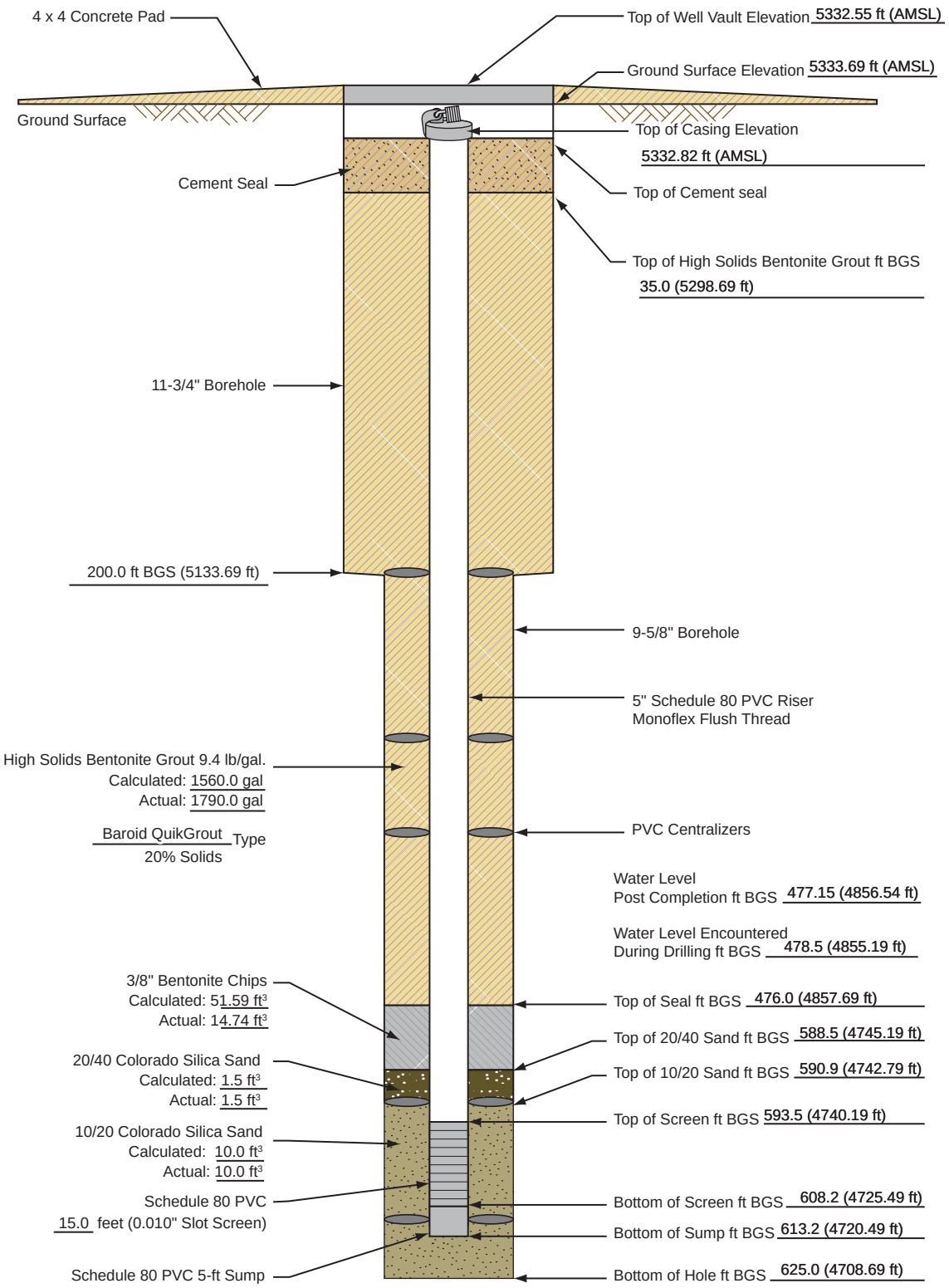
# Monitoring Well Completion Diagram KAFB-106206

Installation Start Date/Time: 7/31/2012 @ 12:00
Installation End Date/Time: 8/09/2012 @ 12:10




** Sand had to be blown out and replaced*

(4,816.90) = *Elevations are NAVD 88 Datum values based on NGS Control Station "Hanger", Elevation = 5,343.43 ft. GPS/RTK methods and GEO1D99 model were used to determine elevations of all surveyed points.*

*Not to Scale*
*BGS = Below Ground Surface*

140705.CB010132_MW_KAFB_106206

Shaw Environmental, Inc.

# Well Development Record

**Project Name**: KAFB BFF

**Location**: Kentucky St

**Well/Piez. No.**: KAFB-106206

**Personnel**: V. Bracht

**Date Installed**: 8/9/12

**Date**: 9/13/12

**Csg. Diameter (I.D.)**: 5"

**Samplers**: N/A

**Total Depth (ft. BGL)**: 613.2

**Method of Development**:

X Surging X Bailing X Pumping

X Original Development ☐Redevelopment ☐Other

**Development Date**: 9/13/12

**Depth to Water Before Developing Well (ft. BGL)**: 478.60

| | | Vol. (V) | | Purge Factor | | Volume to Purge |
|---|---|---|---|---|---|---|
| **Height of Water Column**: | feet = | 153.84 | gal. * | 1 | = | 153.84 |

**$V=(B * r_c^2 * L_c * 7.48)+(B * (r_w^2 - r_c^2) * L_s * Ø_s * 7.48)+(H_2O$ added during drilling/installation) =** 1253.84 gallons

**Depth Purging From**: 603 feet

**Time Purging Begins**: 0855, 9/13/12

**Weather**: Cloudy, Cool, Rain

**Screened Interval (ft BGL)**: 593 - 608

**Equipment Nos.**: **pH Meter:** LVE 002686

**EC Meter**: LVE 002686

**Turbidity Meter**: LVE002384

**Equipment Decontaminated Prior to Development**: Y X N

**Describe**: Steam Cleaned

**Collected Sample of Water Added to Well**: Y N X

**Describe**: N/A

**Comment**: 1100 gallons of water added during drilling/well installation activities

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp.°C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 9/13/2012 | 0855 | 477.80 | 20 | 19.10 | 7.04 | NR* | >1000 | Begin Bailing; Water is Brown |
| 9/13/2012 | 0913 | - - | 55 | 19.20 | 7.70 | NR* | >1000 | Continue Bailing; Water is Brown |
| 9/13/2012 | 0925 | - - | 75 | 18.90 | 7.84 | NR* | >1000 | Continue Bailing; Water is Brown |
| 9/13/2012 | 0935 | - - | 100 | 18.90 | 7.89 | 0.000* | >1000 | Continue Bailing; Water is Brown |
| 9/13/2012 | 1103 | 477.97 | - - | 18.70 | 7.72 | 0.397 | 966.00 | Begin Pumping |
| 9/13/2012 | 1105 | 480.07 | 175 | 19.70 | 7.70 | 0.426 | 697.00 | Water is Very Cloudy |
| 9/13/2012 | 1115 | 480.07 | 275 | 19.90 | 7.69 | 0.414 | 38.30 | Water is Slightly Cloudy |
| 9/13/2012 | 1125 | 480.03 | 375 | 19.80 | 7.70 | 0.358 | 44.50 | Water is Slightly Cloudy |
| 9/13/2012 | 1135 | 480.03 | 475 | 20.10 | 7.70 | 0.437 | 32.70 | Water is Slightly Cloudy |
| 9/13/2012 | 1145 | 480.04 | 575 | 20.30 | 7.70 | 0.466 | 6.84 | Water is Clear |

Notes:
* Water Levels - Reported to the nearest 0.01 foot
* pH - Reading rounded to 0.1 pH units
* Water temperature - Reported to nearest 0.1C
* Turbidity report in NTV nearest whole #
GPM = Gallons Per Minute

Where:
B=3.14
$Ø_s$= porosity of the sand pack
$r_c$= radius of the well casing and screen in feet
$L_c$= length of water column inside the casing and screen in feet
$r_w$= radius of the well bore in feet
$L_s$= length of saturated portion of the sand pack in feet
7.48 gallons/cubic foot= conversion from cubic feet to gallons

Shaw Environmental, Inc.

# Well Development Record

**Project**: KAFB BFF

**Well No**: KAFB-106206

**Project Number**: 140705

**Samplers**: N/A

**Date**: 9/13/12

**Checked By**: N/A

**Time Start**: 0855, 9/13/12

**Time Finish**: 1335, 9/13/12

Field Chemistry (cont'd)

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp °C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 9/13/2012 | 1155 | 480.04 | 675 | 20.30 | 7.70 | 0.436 | 10.60 | Water is Clear |
| 9/13/2012 | 1205 | 480.04 | 775 | 20.30 | 7.71 | 0.438 | 8.97 | Water is Clear |
| 9/13/2012 | 1215 | 480.03 | 875 | 20.30 | 7.71 | 0.424 | 7.57 | Water is Clear |
| 9/13/2012 | 1225 | 480.03 | 975 | 20.30 | 7.74 | 0.305 | 8.89 | Water is Clear |
| 9/13/2012 | 1230 | - - | 1025 | - - | - - | - - | - - | Shut off Pump to Offload Water |
| 9/13/2012 | 1305 | 480.05 | 1050 | 20.40 | 7.69 | 0.496 | 370.00 | Water is Clear |
| 9/13/2012 | 1315 | 480.11 | 1150 | 20.80 | 7.73 | 0.483 | 8.21 | Water is Clear |
| 9/13/2012 | 1325 | 480.12 | 1250 | 21.00 | 7.73 | 0.493 | 7.45 | Water is Clear |
| 9/13/2012 | 1335 | 480.12 | 1350 | 21.00 | 7.71 | 0.490 | 6.40 | Water is Clear; Pump off; Total Removed |

* Due to sample cup design, the YSI Professional Plus does not accurately measure EC from the cup. Sample cup works well in a flow-through set-up, once pumping begins.

**Was well sampled after development?** YES NO X

**Sample Method**: N/A

**Sample Name**: N/A

**Analyses**: N/A

# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Well graded SAND (SW); brown (10YR 4/3); moist; very loose; 100% fine to coarse sand; trace fine gravel to 7 mm, rounded. | SW | Top of Cement Seal | Begin @ 1040. Fill material. |
| 5 | | | | | Same as above (0 ft); 10% fine gravel to 1.7 cm. | SW | | Fill material. |
| 10 | | | | | SILT (ML); strong brown (7.5YR 5/6); dry; soft; 90% silt; 10% very fine sand; trace gravel to 3 cm, nonplastic. | ML | | Native. |
| 15 | | | | | Same as above (10 ft); 15% fine to coarse sand. | ML | Cement Seal | Depth @ 1055. Resume @1102. |
| 20 | | | | | Well graded SAND with gravel (SW); brown (7.5YR 5/4); dry; loose; 60% very fine to very coarse sand; 40% fine gravel to 2.4 cm, subrounded. | SW | | |
| 25 | | | | | Well graded SAND (SW); brown (7.5YR 5/4); dry; very loose; 95% very fine to very coarse sand; 5% fine gravel to 1 cm, subrounded. | SW | | |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:33 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Well graded SAND with gravel (SW); brown (7.5YR 5/4); dry; loose; 60% very fine to very coarse sand; 40% fine gravel to 2.4 cm, subrounded. | SW | | |
| 35 | | | | | Same as above (20 ft); 15% fine gravel; moist; strong brown 7.5YR 4/6. | | Cement Seal | |
| | | | | | Poorly graded SAND (SP); strong brown (7.5YR 4/6); moist; very loose; 95% very fine to medium sand; 2 mm, rounded; 5% silt. | SP | | Depth @ 1119. Resume @ 1126. |
| 40 | | | | | | | | |
| 45 | | | | | Well graded SAND with silt (SW-SM); brown (7.5YR 4/4); moist; very loose; 10% silt; 80% very fine to very coarse sand; 10% fine gravel to 2.3 cm, subrounded. | SW-SM | Top of High Solids Bentonite Grout | |
| | | | | | Lean CLAY lense (CL). | CL | | |
| 50 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; loose; 100% very fine to medium sand; 2 mm, subrounded; trace silt. | SP | | |
| 55 | | | | | | | High Solids Bentonite Grout | |
| | | | | | Well graded SAND (SW); brown 7.5YR 5/4; moist; loose; 100% very fine to very coarse sand; trace fine gravel to 1.3 cm, subrounded. | SW | | Depth @ 1145. |
| 60 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:33 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Poorly graded SAND (SP); strong brown (7.5YR 4/6); moist; loose;100% fine to medium sand; 2 mm, subrounded; trace silt. | SP | | Resume @ 1236. |
| 65 | | | | | Well graded SAND with gravel (SW); brown (7.5YR 4/4); moist; loose; 85% fine to very coarse sand; 15% fine gravel to 1.2 cm. | SW | | |
| 70 | | | | | SILT (ML); strong brown (7.5YR 5/6); moist; soft; nonplastic; 85% silt; 15% very fine sand; trace fine gravel to 8 mm. | ML | High Solids Bentonite Grout | |
| 75 | | | | | Same as above (68 ft); sand fine to very coarse. | | | Depth @ 1247. Resume @ 1252. |
| 80 | | | | | Same as above (68 ft); sandy silt (ML); 80% silt; 20% very fine to very coarse sand; trace fine gravel. | | | |
| 85 | | | | | Same as above (80 ft). | | | |
| 90 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:33 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT (ML); strong brown (7.5YR 4/6); moist; soft; low plasticity; 80% silt; 5% lean clay; 15% fine to coarse sand to 4.5 mm. | | | |
| 95 | | | | | Same as above (90 ft). | | | Depth @1304. Resume @ 1308. |
| 100 | | | | | Same as above (90 ft); trace fine gravel to 9mm. | | | |
| 105 | | | | | Same as above (90 ft); 70% silt; 15% lean clay. | ML | High Solids Bentonite Grout | |
| 110 | | | | | Same as above (90 ft). | | | |
| 115 | | | | | Same as above (90 ft). | | | Depth @ 1324. |
| 120 | | | | | | | | |

# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | SILT (ML); strong brown (7.5YR 5/6); dry; soft; nonplastic; 90% silt; 10% very fine to coarse sand; 4 mm. | | | Resume @ 1335. |
| 125 | | | | | Same as above (120 ft); trace lean clay. | ML | | |
| 130 | | | | | Silty SAND (SM); brown (7.5YR 5/4); moist; loose; 70% very fine to very coarse sand; 30% silt; trace fine gravel to 7 mm, rounded. | | | |
| 135 | | | | | Same as above (130 ft). | SM | High Solids Bentonite Grout | Depth @ 1351. Resume @ 1357. |
| 140 | | | | | Same as above (130 ft). | | | |
| 145 | | | | | Poorly graded GRAVEL (GP); brown (7.5YR 5/4); moist; loose; 85% fine gravel to 1.4 cm; 10% medium to coarse sand; subangular; 5% silt. | GP | | Cyclone partially clogged. Stop to clean out. End 8/17/12 @ 1407. Resume 8/20/12 @ 0806. Stop to detach & unclog cyclone hose @ 0812. Resume @ 0920. Adding water. |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | SILT with gravel (ML); brown (7.5YR 5/4); moist; firm; medium plasticity; 85% silt with trace lean clay; 15% gravel to 2 cm, subrounded. | | | |
| 155 | | | | | Same as above (150 ft). | | | Depth @ 0930. Stop to change flange. Resume @ 1022. |
| 160 | | | | | SILT (ML); light brown (7.5YR 6/4); wet; firm; low plasticity; 100% silt with trace lean clay nodules, < 0.8 mm. | | High Solids Bentonite Grout | |
| 165 | | | | | Same as above (160 ft). | ML | | |
| 170 | | | | | Same as above (160 ft). | | | |
| 175 | | | | | Same as above (160 ft); trace gravel to 3 cm. | | | Depth @ 1037. Resume @ 1044. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | SILT (ML); light brown (7.5YR 6/4); wet; firm; low plasticity; 100% silt; trace lean clay nodules, < 0.08 mm. | | | |
| 185 | | | | | Same as above (160 ft). | | | |
| 190 | | | | | Same as above (160 ft); trace medium sand. | ML | High Solids Bentonite Grout | |
| 195 | | | | | Same as above (160 ft); trace fine gravel to 1.3 cm. | | | Depth @ 1100. Resume @ 1108. |
| 200 | | | | | SILT with gravel (ML); brown (7.5YR 5/4); low plasticity; 75% silt; 25% fine gravel to 2 cm. | | | Depth @ 1115. Total depth with 11 3/4" casing. Resume with 9 5/8" @ 1520. |
| 205 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; very loose; 100% fine to very coarse sand; trace fine gravel to 1 cm, rounded. | SW | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; very loose; 100% fine to very coarse sand; trace fine gravel to 1 cm, rounded. | | | |
| 215 | | | | | Same as above (205 ft). | | | Depth @ 1525. Resume @ 1531. |
| 220 | | | | | Same as above (205 ft). | SW | High Solids Bentonite Grout | |
| 225 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); moist; very loose; 85% very fine to very coarse sand; 15% fine gravel to 2 cm, rounded. | | | |
| 230 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); moist; very loose; 90% very fine to medium sand; 10% coarse sand as pumice grains; trace clay nodules to 8 mm, rounded. | | | |
| 235 | | | | | Same as above (230 ft) | SP | | Depth @ 1537. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); moist; very loose; 90% very fine to medium sand; 10% coarse sand as pumice grains; trace clay nodules to 8 mm, rounded. | SP | | Resume @ 1541<br>Predominately pumice grains.<br>1600-king nipple separated from hammer<br>End 8/20/12<br>Resume @0930 8/21/12. |
| 245 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); moist; very loose; 80% very fine to very coarse sand; 20% fine gravel to 2.1 cm, rounded. Note: grains are granite again. | SW | | |
| 250 | | | | | Same as above (245 ft). | | High Solids Bentonite Grout | |
| 255 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); moist; very loose; 90% fine to medium sand; 10% coarse sand; trace fine gravel to 1.9 cm, rounded | SP | | Some pumice grains.<br>Depth @ 0933.<br>Resume @ 1000. |
| 260 | | | | | Same as above (255 ft). | | | |
| 265 | | | | | Same as above (255 ft). | | | |
| 270 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:33 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose 90% very fine to very coarse sand; 10% fine gravel to 1.3 cm, rounded. | | | |
| 275 | | | | | Same as above (270 ft); 5% gravel. | SW | | Depth @ 1007. Resume @ 1013. |
| 280 | | | | | Same as above (270 ft); trace gravel. | | High Solids Bentonite Grout | |
| 285 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; loose; 95% fine to medium sand; 5% coarse sand; trace fine gravel to 2.1 cm, rounded. | SP | | |
| 290 | | | | | Well graded SAND (SW); brown (10YR 5/3) moist; loose; 90% very fine to very coarse sand; 10% fine gravel to 1.1 cm, rounded. | | | |
| 295 | | | | | Same as above (290 ft); trace fine gravel. | SW | | Depth @ 1021. |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:33 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded SAND (SW); brown (10YR 5/3) moist; loose; 90% very fine to very coarse sand; 10% fine gravel to 1.1 cm, rounded. | SW | | Resume @ 1026. |
| 305 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); moist; loose; 95% fine to medium sand; 5% coarse sand; trace fine gravel to 4 cm, rounded. | SP | | |
| 310 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); dry; loose; 100% very fine to very coarse sand; trace fine gravel to 1.3 cm, rounded. | SW | High Solids Bentonite Grout | |
| 315 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; loose; 100% fine to medium sand; trace fine gravel to 2.7 mm, rounded. | SP | | Depth @1036. Resume @ 1043. |
| 320 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% fine to very coarse sand; trace fine gravel to 9 mm, rounded. | SW | | |
| 325 | | | | | Same as above (320ft); 5% fine gravel. | | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:33 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 90% fine to very coarse sand; 10% fine gravel to 9 mm, rounded. Note: 10% fine gravel at 333 ft, 5% medium gravel to 6 mm. | | | |
| 335 | | | | | Same as above (320 ft). | | | Depth @ 1055. Resume @ 1100. |
| 340 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); moist; medium dense; 80% fine to very coarse sand; 20% fine gravel to 1.3 cm, rounded. | SW | High Solids Bentonite Grout | |
| 345 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; medium dense; 95% very fine to coarse sand; 5% fine gravel to 1.1 cm, rounded. | | | |
| 350 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; medium dense; 100% fine to medium sand; 2 mm, subrounded. | SP | | |
| 355 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; medium dense; 95% very fine to coarse sand; 5% gravel to 2.8 cm. | SW | | Depth @ 1111. Resume @ 1118. |
| 360 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:33 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; medium dense; 95% very fine to coarse sand; 5% gravel to 2.8 cm. | SW | | Depth @ 1111. Resume @ 1118. |
| | | | | | Poorly graded GRAVEL with sand (GP); brown (10YR 5/3); moist; medium dense; 60% fine gravel to 2.6 cm; 40% fine to very coarse sand, rounded. Note: gravel is granitic. | GP | | 1126-flange broke off of hammer. Resume @ 1406. |
| 365 | | | | | | | | |
| | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); dry; medium dense; 85% fine to very coarse sand; 15% fine gravel to 1.3 cm, subrounded. | SW | | |
| 370 | | | | | | | | |
| | | | | | Poorly graded SAND with gravel (SP); brown (10YR 5/3); moist; medium dense; 80% medium to very coarse sand; 20% fine gravel to 1.2 cm, subrounded. | SP | | |
| | | | | | Poorly graded GRAVEL with sand (GP); brown (10 YR 5/3); 80% fine gravel to 3.3 cm; 20% fine to very coarse sand, rounded. Note: granite fragments. Sand is medium to very coarse at 375 ft. | GP | High Solids Bentonite Grout | Depth @ 1420. Resume @ 1431. |
| 375 | | | | | | | | |
| 380 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; medium dense; 100% fine to very coarse sand; trace fine gravel to 9 mm, rounded. | SW | | |
| 385 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; medium dense; 100% fine to very coarse sand; trace fine gravel to 9 mm, rounded. | | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
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Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
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Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; medium dense; 95% fine to very coarse sand; 5% fine gravel to 9 mm, rounded. | | | |
| 395 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); dry; dense; 85% fine to very coarse sand; 15% fine gravel to 1.7 cm, rounded. | | | Depth @ 1445. Resume @ 1452. |
| 400 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); moist; dense; 90% fine to very coarse sand; 10% fine gravel to 1 cm, rounded. | SW | High Solids Bentonite Grout | |
| 405 | | | | | Same as above (400 ft); slightly coarser. | | | |
| 410 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); moist; dense; 95% fine to medium sand; 5% coarse sand; 4 mm, rounded. | SP | | |
| 415 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; dense; 95% very fine to very coarse sand; 5% fine gravel to 1.8 cm, rounded. | SW | | Depth @ 1511. |
| 420 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:33 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); dry; very dense; 90% medium to very coarse sand; 10% fine gravel to 1.8 cm, subangular to subrounded. | | | Resume @ 1521. Hammering down very slowly. |
| 425 | | | | | Same as above (420 ft); trace fine sand. | SP | High Solids Bentonite Grout | |
| 430 | | | | | Poorly graded GRAVEL (GP); brown (10YR 5/3); dry; very dense; 90% fine gravel to 2.2 cm; 10% coarse sand, rounded. Note: granitic fragments. | GP | | |
| 435 | | | | | Poorly graded SAND with gravel (SP); brown (10YR 5/3); moist; very dense; 85% medium to coarse sand; 15% fine gravel to 1 cm, rounded. | SP | Top of Bentonite Seal | Depth @ 1548. Casing stuck-end 8/21/12. Resume @ 0805 on 8/22/12. |
| 440 | | | | | Poorly graded GRAVEL with sand (GP); yellowish brown (10YR 5/4); moist; very dense; 60% fine gravel to 3.5 cm, rounded; 40% medium to coarse sand, rounded. Note: granitic fragements. | GP | | Adding water to bring cuttings up. |
| 445 | | | | | Poorly graded SAND with gravel (SP); brown (10YR 5/3); moist; very dense; 70% medium to very coarse sand; 30% fine gravel to 2.7 cm, rounded. | SP | Bentonite Seal | |
| 450 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:33 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; very dense; 95% medium to very coarse sand; 5% fine gravel to 1.1 cm, subrounded. | | | |
| 455 | | | | | Poorly graded SAND with gravel (SP); brown (10YR 5/3) moist; very dense; 85% medium to very coarse sand; 15% fine gravel to 2 cm, rounded. | SP | Bentonite Seal | Added ~ 50gal. Depth @ 0837. Stopped to tighten bolts on flange. |
| 460 | | | | | Same as above (455 ft). | | | Resume @ 0903. |
| 465 | | | | | Poorly graded GRAVEL with sand (GP); yellowish brown (10YR 5/4) moist; very dense; 60% fine gravel to 1.7 cm, rounded; 40% medium to very coarse; sand, subrounded. | GP | Top of 20/40 Sand<br>Top of 10/20 Sand | Granitic fragments. |
| 470 | | | | | Poorly graded SAND with gravel (SP); yellowish brown (10YR 5/4); moist; dense; 70% medium to very coarse sand, rounded; 30% fine gravel to 2 cm, rounded. | | Top of 5" Schedule 80 PVC 0.010" Slot Screen | Driving easier. |
| 475 | | | | | Same as above (470 ft); 85% sand; 15% fine gravel. | SP | | Depth @ 0921. |
| 480 | | | | | | | | |

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# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | | | Poorly graded SAND with silt (SP-SM); brown (10YR 5/3); wet; dense; 90% fine to medium sand; 10% silt; 2 mm, rounded. | SP-SM | | Resume @ 0926. Water level @ 482'. |
| 485 | | | | | Silty SAND (SM); brown (10YR 5/3); wet; dense; 70% fine to medium sand; 30% silt to 1 mm, rounded. | SM | | |
| 490 | | | | | Same as above (485 ft). | | | Water Level After Drilling. |
| 495 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); wet; dense; 90% fine to very coarse sand; 10% fine gravel to 1.5 cm, rounded. | | | |
| 500 | | | | | Well graded SAND with gravel (SW); yellowish brown (10YR 5/4); wet; dense; 85% fine to very coarse sand; 15% fine gravel to 2 cm, rounded. | SW | | Depth @ 0950. Resume @ 0957. |
| 505 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); wet; dense; 95% fine to very coarse sand; 5% fine gravel to 2 cm, rounded. | | Bottom of 5" Schedule 80 PVC 0.010" Slot Screen Sump; Bottom of Sump | |
| 510 | | | | | | | | |

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# Borehole ID: KAFB-106207

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/17/2012
Date TD Reached: 8/22/2012
Date Completed: 8/22/2012
Ground Elevation AMSL (ft): 5345.16
Y Coordinate: 1480123.29
X Coordinate: 1546033.69

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 482.00
At End Of Drilling: N/A
After Drilling: 489.79
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 510 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); wet; dense; 80% fine to very coarse sand; 20% fine gravel to 1.3 cm, rounded. | | | |
| 515 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; dense; 100% fine to very coarse sand; trace fine gravel to 1.3 cm, rounded. | SW | | Depth @ 1016. Resume @ 1026. |
| 520 | | | | | Same as above (515 ft); 10% fine gravel | | | |
| 525 | | | | | Poorly graded GRAVEL with sand (GP); brown (10YR 5/3); wet; dense; 75% fine gravel to 2.1 cm, well rounded; 25% fine to very coarse sand, rounded; trace silt. Note: granitic fragments. | GP | | |
| 530 | | | | | No recovery. | | | Total depth @ 530' @ 1042. Added ~ 600 gallons water total. |
| 535 | | | | | | | | |
| 540 | | | | | | | | |

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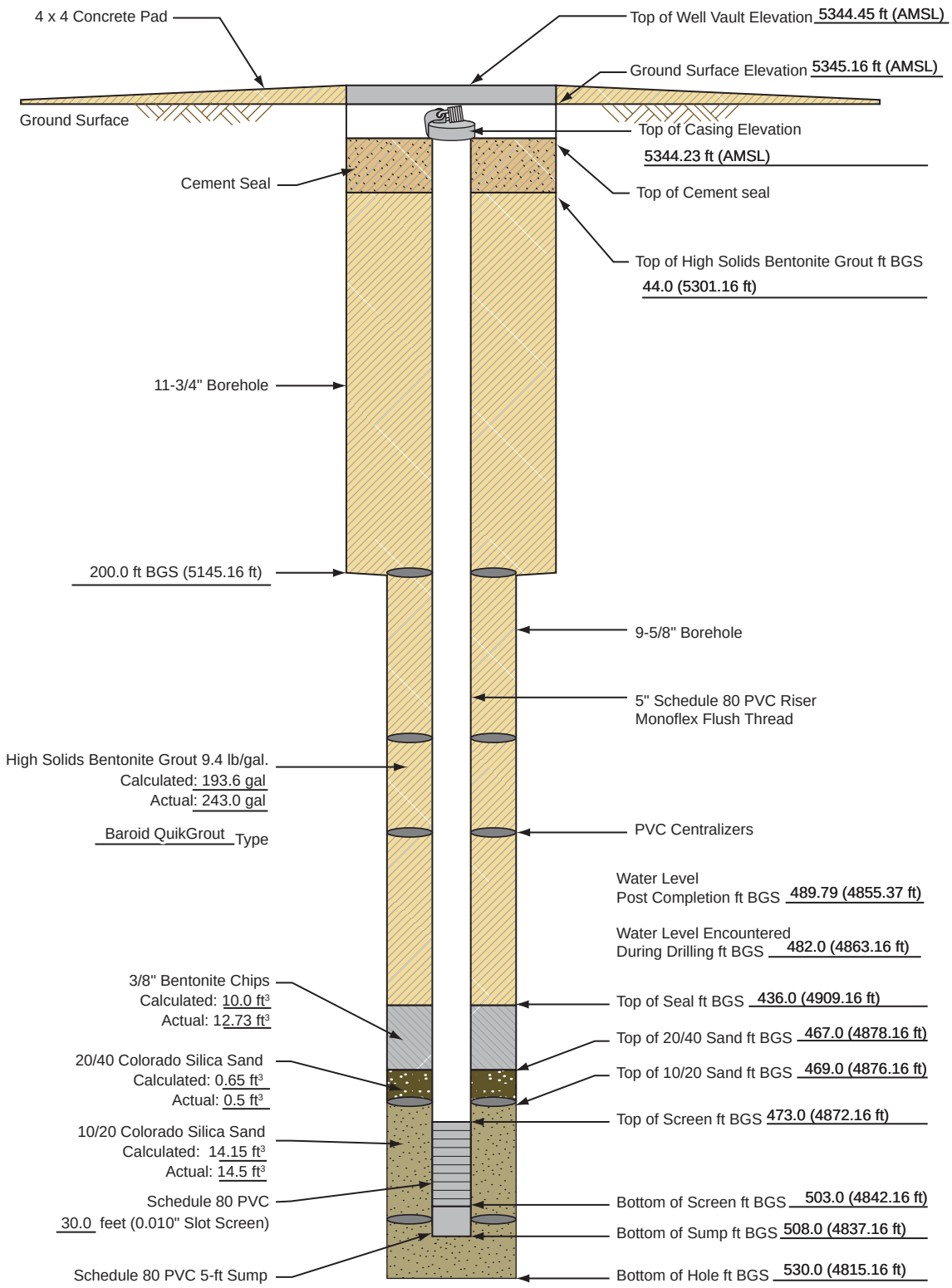
# Monitoring Well Completion Diagram KAFB-106207

Installation Start Date/Time: 8/17/2012 @ 15:00
Installation End Date/Time: 8/22/2012 @ 11:30




** Sand had to be blown out and replaced*

(4,816.90) = *Elevations are NAVD 88 Datum values based on NGS Control Station "Hanger", Elevation = 5,343.43 ft. GPS/RTK methods and GEO1D99 model were used to determine elevations of all surveyed points.*

*Not to Scale*
*BGS = Below Ground Surface*

140705.CB010133_MW_KAFB_106207.A3

Shaw Environmental, Inc.

# Well Development Record

**Project Name**: KAFB BFF

**Location**: Mesilla

**Well/Piez. No.**: KAFB-106207

**Personnel**: V. Bracht

**Date Installed**: 8/22/12

**Date**: 9/12/12

**Csg. Diameter (I.D.)**: 5"

**Samplers**: N/A

**Total Depth (ft. BGL)**: 508

**Method of Development**:

X Surging X Bailing X Pumping

X Original Development ☐Redevelopment ☐Other

**Development Date**: 9/12/12

**Depth to Water Before Developing Well (ft. BGL)**: 491.25

| | | Vol. (V) | | Purge Factor | | Volume to Purge |
|---|---|---|---|---|---|---|
| **Height of Water Column**: | feet = | 30.99 | gal. * | 1 | = | 30.99 |

**V=(B * $r_c^2$ * $L_c$ * 7.48)+(B * ($r_w^2$ - $r_c^2$) * $L_s$ * $Ø_s$ * 7.48)+($H_2O$ added during drilling/installation) =** 630.99 gallons

**Depth Purging From**: 496 feet

**Time Purging Begins**: 0834, 9/12/12

**Weather**: Cloudy, Cool, Rain

**Screened Interval (ft BGL)**: 473 - 503

**Equipment Nos.**: **pH Meter:** LVE 002686

**EC Meter**: LVE 002686

**Turbidity Meter**: LVE002384

**Equipment Decontaminated Prior to Development**: Y X N

**Describe**: Steam Cleaned

**Collected Sample of Water Added to Well**: Y N X

**Describe**: N/A

**Comment**: 600 gallons of water added during drilling/well installation activities

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp.°C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 9/12/2012 | 0834 | 490.50 | 20 | 19.10 | 7.10 | 0.001* | >1000 | Begin Bailing; Water is Muddy Brown |
| 9/12/2012 | 0856 | - - | 60 | 19.70 | 7.91 | 0.001* | >1000 | Continue Bailing; Water is Brown |
| 9/12/2012 | 0912 | - - | 90 | 19.60 | 7.84 | 0.001* | 841.00 | Continue Bailing; Water is Brown |
| 9/12/2012 | 0918 | - - | 100 | - - | - - | - - | - - | Bailed |
| 9/12/2012 | 1149 | 490.52 | - - | - - | - - | - - | - - | Begin Pumping at 10 GPM |
| 9/12/2012 | 1150 | 493.10 | - - | 19.80 | 7.59 | 0.443 | 58.70 | Water is Cloudy |
| 9/12/2012 | 1155 | 493.25 | 150 | 20.00 | 7.68 | 0.441 | 10.10 | Water is Clear |
| 9/12/2012 | 1200 | 493.29 | 200 | 20.00 | 7.70 | 0.439 | 5.48 | Water is Clear |
| 9/12/2012 | 1205 | 493.31 | 250 | 20.00 | 7.71 | 0.438 | 3.61 | Water is Clear |
| 9/12/2012 | 1210 | 493.35 | 300 | 20.00 | 7.73 | 0.435 | 2.84 | Water is Clear |

Notes:
* Water Levels - Reported to the nearest 0.01 foot
* pH - Reading rounded to 0.1 pH units
* Water temperature - Reported to nearest 0.1C
* Turbidity report in NTV nearest whole #
GPM = Gallons Per Minute

Where:
B=3.14
$Ø_s$= porosity of the sand pack
$r_c$= radius of the well casing and screen in feet
$L_c$= length of water column inside the casing and screen in feet
$r_w$= radius of the well bore in feet
$L_s$= length of saturated portion of the sand pack in feet
7.48 gallons/cubic foot= conversion from cubic feet to gallons

Shaw Environmental, Inc.

# Well Development Record

**Project**: KAFB BFF

**Well No**: KAFB-106207

**Project Number**: 140705

**Samplers**: N/A

**Date**: 9/12/12

**Checked By**: N/A

**Time Start**: 0834, 9/12/12

**Time Finish**: 1250, 9/12/12

Field Chemistry (cont'd)

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp °C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 9/12/2012 | 1215 | 493.37 | 375 | 20.20 | 7.75 | 0.445 | 2.62 | Water is Clear |
| 9/12/2012 | 1220 | 493.39 | 425 | 20.30 | 7.75 | 0.444 | 2.68 | Water is Clear |
| 9/12/2012 | 1225 | 493.41 | 475 | 20.20 | 7.75 | 0.444 | 2.17 | Water is Clear |
| 9/12/2012 | 1228 | - - | 500 | - - | - - | - - | - - | Pump off; Tank Full |
| 9/12/2012 | 1235 | 493.33 | - - | 21.30 | 7.82 | 0.450 | 1.95 | Continue Pumping; Water is Clear |
| 9/12/2012 | 1240 | 493.42 | 550 | 20.20 | 7.75 | 0.436 | 3.50 | Water is Clear |
| 9/12/2012 | 1245 | 493.52 | 600 | 20.20 | 7.77 | 0.434 | 1.86 | Water is Clear |
| 9/12/2012 | 1250 | 493.55 | 650 | 20.20 | 7.77 | 0.433 | 1.90 | Water is Clear; Pump off; Total Removed |

* Due to sample cup design, the YSI Professional Plus does not accurately measure EC from the cup. Sample cup works well in a flow-through set-up, once pumping begins.

**Was well sampled after development?** YES NO X

**Sample Method**: N/A

**Sample Name**: N/A

**Analyses**: N/A

# Borehole ID: KAFB-106208

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/8/2012
Date TD Reached: 8/10/2012
Date Completed: 8/16/2012
Ground Elevation AMSL (ft): 5344.18
Y Coordinate: 1480157.63
X Coordinate: 1546034.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Silty SAND (SM); brown (7.5YR 5/4); dry; very loose; 75% very fine to very coarse sand; 20% silt; 5% fine gravel to 2cm. | SM | Top of Cement Seal | Begin @ 0908. |
| 5 | | | | | Same as above (0ft). | | | |
| 10 | | | | | SILT with gravel (ML); brown (7.5YR 4/4); moist; stiff; medium plasticity; 70% silt; 5% lean clay; 25% gravel to 3.4cm. | ML | Cement Seal | |
| 15 | | | | | SILT (ML); reddish brown (5YR 5/4); moist; very soft; low plasticity; 85% silt; 15% very fine to medium sand; trace fine gravel to 8 mm. | | | Depth @ 0926.<br>Begin @ 0953. |
| 20 | | | | | Silty SAND (SM); brown (7.5YR 5/4); moist; very loose; 85% very fine to very coarse sand; 15% silt; trace fine gravel to 3.5 cm, subrounded. | SM | | |
| 25 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; very loose; 95% very fine to medium sand; 2 mm, subrounded; 5% silt. | SP | | |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:41 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

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Project Number: 140705
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Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; very loose; 85% very fine to medium sand; 2 mm, subrounded; 10% fine gravel to 2 cm, 5% silt. | | Top of High Solids Bentonite Grout | |
| 35 | | | | | Same as above (25 ft); with gravel (SP); 70% sand; 25% gravel; 5% silt. | SP | | Depth @ 0952. Resume @ 1001. |
| 40 | | | | | Same as above (25 ft). | | | |
| 45 | | | | | Well graded SAND (SW); brown (7.5YR 5/4);dry; very loose; 90% very fine to very coarse sand; 10% fine gravel to 1.5 cm, trace silt. | SW | | |
| 50 | | | | | Silty SAND (SM); strong brown (7.5YR 4/6); moist; very loose; 80% very fine to coarse sand; trace fine gravel to 1.2 cm, subrounded; 20% silt. | SM | | |
| 55 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); dry; very loose; 95% very fine to medium sand; 5% silt; trace fine gravel to 8mm, subrounded. | SP | High Solids Bentonite Grout | Depth @ 1024. |
| 60 | | | | | | | | |

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# Borehole ID: KAFB-106208

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/8/2012
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Ground Elevation AMSL (ft): 5344.18
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Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | | | | |
| | | | | | Well graded SAND (SW); brown (7.5YR 5/4); moist; loose; 90% very fine to very coarse sand; 5% fine gravel to 1.5 cm, rounded; 5% silt. | SW | | Resume @ 1030. |
| 65 | | | | | Same as above (60 ft); well graded sand with gravel; 65% sand; 30% gravel; 5% silt. | | | |
| | | | | | SILT (ML); strong brown (7.5YR 5/6); moist; soft; low plasticity; 85% silt; 15% very fine to medium sand; trace fine gravel to 1.4 cm. | | | |
| 70 | | | | | Same as above (67 ft) | ML | High Solids Bentonite Grout | |
| 75 | | | | | Same as above (67 ft) | | | Depth @ 1047. Resume @ 1053. |
| 80 | | | | | Silty SAND (SM); brown (7.5YR 5/4); loose; dry; 75% very fine to very coarse sand; 5% fine gravel to 1 cm, subrounded; 20% silt. | SM | | |
| 85 | | | | | SILT with sand (ML); brown (7.5YR 5/4); soft; moist; low plasticity; 80% silt; 20% very fine to very coarse sand; trace fine gravel to 1.3 cm. | ML | | |
| 90 | | | | | | | | |

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Project Location: KAFB, Albuquerque, NM
Date Started: 8/8/2012
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Ground Elevation AMSL (ft): 5344.18
Y Coordinate: 1480157.63
X Coordinate: 1546034.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | SILT with sand (ML); brown (7.5YR 5/4); soft; moist; low plasticity; 80% silt; 15% very fine to very coarse sand; 5% lean clay; trace fine gravel to 1.3 cm. | ML | | |
| 95 | | | | | Same as above (85 ft). | | | Depth @ 1111. Resume @ 1118. |
| 100 | | | | | Same as above (85 ft). | | | |
| 105 | | | | | Same as above (85 ft); trace lean clay. | | High Solids Bentonite Grout | |
| 110 | | | | | Same as above (85 ft); trace lean clay. | | | Very fine sediment coming out. |
| 115 | | | | | No recovery. | | | Depth @ 1200. |
| 120 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:41 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

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Project Number: 140705
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Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | Poorly graded GRAVEL (GP); brown (7.5YR 5/3); moist; loose; 70% fine gravel to 1.2 cm, 30% medium to coarse sand; subrounded; trace silt. Note: gravel is granitic. | GP | | Resume @ 1257. Adding water. |
| 125 | | | | | Silty GRAVEL with sand (GM); brown (7.5YR 4/4); wet; loose; 50% fine gravel to 1.7 cm, 25% medium to very coarse sand, subrounded; 25% silt; trace lean clay. | GM | | |
| 130 | | | | | Poorly graded GRAVEL (GP); brown (7.5YR 5/3); moist; loose; 85% fine gravel; 2 cm, subrounded; 10% medium to very coarse sand; 5% silt. Note: gravel is granitic. | GP | | Limited recovery. |
| 135 | | | | | Silty SAND (SM); brown (7.5YR 5/4); wet; medium dense; 60% fine to very coarse sand; 10% fine gravel to 1 cm, subrounded; 30% silt; trace lean clay. | SM | High Solids Bentonite Grout | Depth @ 1320. Resume 1327. |
| 140 | | | | | Same as above (135 ft); 5% gravel; 35% silt. | | | |
| 145 | | | | | Same as above (135 ft); no gravel; 40% silt. | | | |
| 150 | | | | | | | | |

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# Borehole ID: KAFB-106208

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/8/2012
Date TD Reached: 8/10/2012
Date Completed: 8/16/2012
Ground Elevation AMSL (ft): 5344.18
Y Coordinate: 1480157.63
X Coordinate: 1546034.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Sandy SILT (ML); brown (7.5YR 5/4); wet; soft; low plasticity; 60% silt; 30% fine to very coarse sand; 10% gravel to 3.8 cm. | | | |
| 155 | | | | | SILT (ML); brown (7.5YR 5/4); wet; soft; low plasticity; 85% silt;15% fine to medium sand; 2 mm. | | | Depth @ 1344. Resume @ 1355. |
| 160 | | | | | Same as above (155 ft). | | | |
| 165 | | | | | Same as above (155 ft); trace lean clay nodules. | ML | High Solids Bentonite Grout | |
| 170 | | | | | Same as above (165 ft). | | | |
| 175 | | | | | Same as above (155 ft). | | | Depth @ 1416. |
| 180 | | | | | | | | |

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# Borehole ID: KAFB-106208

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/8/2012
Date TD Reached: 8/10/2012
Date Completed: 8/16/2012
Ground Elevation AMSL (ft): 5344.18
Y Coordinate: 1480157.63
X Coordinate: 1546034.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | No recovery. | | | Resume @ 1424. |
| 185 | | | | | No recovery. | | | |
| 190 | | | | | SILT (ML); 85% silt; wet; medium firm; trace lean clay nodules; 15% very fine to coarse sand. | ML | High Solids Bentonite Grout | Impossible to tell what depth this came from. |
| 195 | | | | | No recovery. | | | Depth @ 1451. Resume @ 1506. |
| 200 | | | | | Sandy SILT (ML); pale brown (10YR 6/3); wet; firm; low plasticity; 60% silt with lean clay; 40% fine to medium sand; 2 mm, rounded. | ML | | Total depth with 11 3/4" casing. Begin 9 5/8" casing. Depth @1512. End 8/8/12. Resume 8/9/12 @ 0959. |
| 205 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); moist; very loose; 100% fine to very coarse sand; 4 mm, subangular. | SW | | |
| 210 | | | | | | | | |

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# Borehole ID: KAFB-106208

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/8/2012
Date TD Reached: 8/10/2012
Date Completed: 8/16/2012
Ground Elevation AMSL (ft): 5344.18
Y Coordinate: 1480157.63
X Coordinate: 1546034.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); moist; loose; 100% very fine to medium sand; trace coarse sand, 3 mm, subrounded. | SP | | |
| 215 | | | | | Same as above (210 ft); slightly coarser. | | | |
| 220 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% very fine to very coarse sand; trace fine gravel to 1 cm, subrounded. | SW | High Solids Bentonite Grout | Depth @ 1008. Resume @ 1013. |
| 225 | | | | | Same as above (218 ft); 5% fine gravel to 2.1 cm. | | | |
| 230 | | | | | Same as above (218 ft). Note: some pumice grains. | | | |
| 235 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); moist; loose; 95% fine sand; 5% medium sand; 2 mm, rounded. Note: some pumice grains. | SP | | Depth @ 1021. |
| 240 | | | | | | | | |

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# Borehole ID: KAFB-106208

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/8/2012
Date TD Reached: 8/10/2012
Date Completed: 8/16/2012
Ground Elevation AMSL (ft): 5344.18
Y Coordinate: 1480157.63
X Coordinate: 1546034.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); moist; loose; 90% fine to medium sand; 10% coarse sand as pumice grains; 2 mm, rounded. | SP | | Resume. |
| 245 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); moist; loose; 85% very fine to very coarse sand; 15% fine gravel to 1 cm, rounded. Note: grains are granitic. | SW | | |
| 250 | | | | | Same as above (243 ft); fine gravel to 2.8cm. | | High Solids Bentonite Grout | |
| 255 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; loose; 100% fine to medium sand; 2 mm, subrounded. | SP | | Depth @ 1034. Resume @ 1041. |
| 260 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); dry; loose; 95% fine to very coarse sand; 5% fine gravel to 1.5 cm, subrounded. | SW | | |
| 265 | | | | | Same as above (260 ft). | | | |
| 270 | | | | | | | | |

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# Borehole ID: KAFB-106208

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/8/2012
Date TD Reached: 8/10/2012
Date Completed: 8/16/2012
Ground Elevation AMSL (ft): 5344.18
Y Coordinate: 1480157.63
X Coordinate: 1546034.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; loose; 95% fine to medium sand; 5% coarse sand; trace fine gravel to 1 cm, rounded. | SP | | |
| 275 | | | | | Same as above (270 ft); finer; no coarse sand or gravel. | | | Depth @ 1045. Resume @ 1051. |
| 280 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% very fine to very coarse sand; trace fine gravel to 1 cm, rounded. | SW | High Solids Bentonite Grout | |
| 285 | | | | | Same as above (279 ft); slightly finer. | | | |
| 290 | | | | | Same as above (279 ft); 5% fine gravel. | | | |
| 295 | | | | | Same as above (279 ft); 5% fine gravel. | | | Depth @ 1058. |
| 300 | | | | | | | | |

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# Borehole ID: KAFB-106208

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/8/2012
Date TD Reached: 8/10/2012
Date Completed: 8/16/2012
Ground Elevation AMSL (ft): 5344.18
Y Coordinate: 1480157.63
X Coordinate: 1546034.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 90% very fine to very coarse sand; 10% fine gravel to 1 cm, rounded. | SW | | Resume @ 1105. |
| 305 | | | | | Poorly graded SAND (SP); pale brown (10YR 6/3); dry; loose; 100% very fine to medium sand; trace fine gravel to 4.7 cm, well rounded. | | | |
| 310 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; loose; 100% very fine sand; 1 mm rounded; trace silt. | SP | High Solids Bentonite Grout | |
| 315 | | | | | Same as above (310 ft); pale brown (10YR 6/3); fine to medium sand. | | | Depth @ 1115. Resume @ 1221. |
| 320 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% very fine to coarse sand; 4 mm, rounded. | | | |
| 325 | | | | | Same as above (320 ft). | SW | | |
| 330 | | | | | | | | |

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Project Location: KAFB, Albuquerque, NM
Date Started: 8/8/2012
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Ground Elevation AMSL (ft): 5344.18
Y Coordinate: 1480157.63
X Coordinate: 1546034.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 95% very fine to coarse sand; 5% fine gravel to 1.2 cm, rounded. | SW | | |
| 335 | | | | | Same as above (320 ft); trace fine gravel. | | | Depth @ 1231. Resume @ 1236. |
| 340 | | | | | Same as above (320 ft); 5% fine gravel. | | | |
| 345 | | | | | Same as above (340 ft). | | High Solids Bentonite Grout | |
| 350 | | | | | Same as above (320 ft); 10% fine gravel. | | | |
| 355 | | | | | Same as above (350 ft). | | | Depth @ 1246. |
| 360 | | | | | | | | |

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Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/8/2012
Date TD Reached: 8/10/2012
Date Completed: 8/16/2012
Ground Elevation AMSL (ft): 5344.18
Y Coordinate: 1480157.63
X Coordinate: 1546034.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; loose; 100% very fine to coarse sand; 4 mm, rounded. | SW | | Resume @ 1252. |
| 365 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); moist; medium dense; 75% fine to very coarse sand; 25% gravel to 3.6 cm, subrounded. | | | |
| 370 | | | | | Poorly graded SAND with gravel (SP); brown (10YR 5/3); moist; medium dense; 85% fine to medium sand; 15% fine gravel to 3.7 cm, well rounded. | SP | High Solids Bentonite Grout | |
| 375 | | | | | Same as above (380 ft); poorly graded sand; no gravel. | | | Depth @ 1303. Resume @ 1409. |
| 380 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; medium dense; 100% very fine to coarse sand; trace fine gravel to 3.2 cm, rounded. | SW | | |
| 385 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; medium dense; 100% very fine to coarse sand; trace fine gravel to 3.2 cm, rounded. Coarser than above (380 ft). | | | |
| 390 | | | | | | | | |

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Y Coordinate: 1480157.63
X Coordinate: 1546034.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; medium dense; 100% very fine to coarse sand; trace fine gravel to 3.2 cm, rounded. Coarser than above (380 ft). | | | |
| 395 | | | | | Same as above (380 ft). | SW | | Depth @ 1424. Resume @ 1435. |
| 400 | | | | | Same as above (380 ft). | | High Solids Bentonite Grout | |
| 405 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; medium dense; 100% fine to medium sand; trace fine gravel to 1.3 cm, rounded. | SP | | |
| 410 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; medium dense; 100% fine to very coarse sand; 4 mm, rounded. | | | |
| 415 | | | | | Same as above (410 ft); 10% fine gravel to 2.3 cm. | SW | | Depth @ 1453. Resume @ 1520. |
| 420 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:41 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

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Ground Elevation AMSL (ft): 5344.18
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Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); dry; medium dense; 100% very fine to medium sand; trace coarse sand to 3 mm, rounded. | SP | | |
| 425 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; medium dense; 100% fine to very coarse sand; trace fine gravel, 6 mm, rounded. | SW | High Solids Bentonite Grout | |
| 430 | | | | | Same as above (425 ft); 5% fine gravel. | | | |
| 435 | | | | | Same as above (425 ft); 5% fine gravel. | | | Depth @ 1537. Resume @ 1546. |
| 440 | | | | | Same as above (425 ft). | | | |
| 445 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; dense; 90% very fine to medium sand; 10% fine gravel to 2.5 cm, rounded. | SP | | |
| 450 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:41 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

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Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
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Ground Elevation AMSL (ft): 5344.18
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Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; dense; 100% fine to very coarse sand; 4.5 mm, rounded. | | | |
| 455 | | | | | Same as above (450 ft); 5% fine gravel to 1 cm. | SW | | Depth @ 1605. End 8/9/12. Begin @ 1025 on 8/10/12. |
| 460 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); dry; medium dense; 100% fine to medium sand; 2 mm; rounded | SP | High Solids Bentonite Grout | |
| 465 | | | | | Well graded SAND (SW); yellowish brown (10YR 5/4); dry; medium dense; 100% fine to coarse sand; trace fine gravel to 7 mm, rounded. | | | |
| 470 | | | | | Same as above (463 ft); 10% fine gravel to 1.6 cm. | SW | | |
| 475 | | | | | Same as above (463 ft). | | | Depth @ 1046. |
| 480 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:41 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

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Date Started: 8/8/2012
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Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | | | SILT (ML); brown (7.5YR 5/4); moist; firm; non-plastic to low plasticity; 85% silt; 15% very fine to medium sand; 2 mm, rounded. | ML | | Resume @ 1054. |
| | | | | | Poorly graded SAND (SP); yellowish brown (10YR 5/4); moist; medium dense; 100% very fine to medium sand; 2 mm, rounded. | | Top of Bentonite Seal | |
| 485 | | | | | | | | |
| 490 | | | | | Same as above (483 ft); trace coarse sand to 4mm. | SP | 5" Schedule 80 PVC Riser | Water level after drilling. |
| 495 | | | | | Same as above (483 ft); trace fine grave to 1.1 cm, overall coarser fine to medium. | | Top of 20/40 Sand<br>Top of 10/20 Sand | Water level during drilling.<br>Depth @ 1109.<br>Resume @1118. |
| 500 | | | | | Well graded SAND (SW); brown (10YR 4/3); wet; dense; 95% fine to very coarse sand; 5% fine gravel to 1.2 cm, rounded. | | Top of 5" Schedule 80 PVC 0.010" Slot Screen | |
| 505 | | | | | Same as above (500 ft); gravel to 4.4 cm. | SW | | |
| 510 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:41 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106208

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/8/2012
Date TD Reached: 8/10/2012
Date Completed: 8/16/2012
Ground Elevation AMSL (ft): 5344.18
Y Coordinate: 1480157.63
X Coordinate: 1546034.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 510 | | | | | Well graded SAND (SW); brown (10YR 4/3); wet; dense; 95% fine to very coarse sand; 5% fine gravel to 1.2 cm, rounded. | | | |
| 515 | | | | | Same as above (500 ft). | | | Added ~ 50 gal. water Depth @ 1133. Resume @ 1139. |
| 520 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); wet; medium dense; 60% fine to very coarse sand; 40% fine gravel to 1.5 cm, rounded. Note: granitic fragments. | | - Bottom of 5" Schedule 80 PVC 0.010" Slot Screen<br>- Sump<br>- Bottom of Sump | |
| 525 | | | | | Same as above (520 ft); overall finer. | SW | | |
| 530 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; medium dense; 95% fine to very coarse sand; 5% fine gravel to 8 mm; rounded. | | | |
| 535 | | | | | Same as above (530 ft); trace fine gravel. | | | |
| 540 | | | | | | | - Bottom of Filter Pack | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:41 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106208

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 8/8/2012
Date TD Reached: 8/10/2012
Date Completed: 8/16/2012
Ground Elevation AMSL (ft): 5344.18
Y Coordinate: 1480157.63
X Coordinate: 1546034.11

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11 3/4
Hole Diameter Lower (in.) 9 5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 496.00
At End Of Drilling: N/A
After Drilling: 488.85
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Jason Tarbert

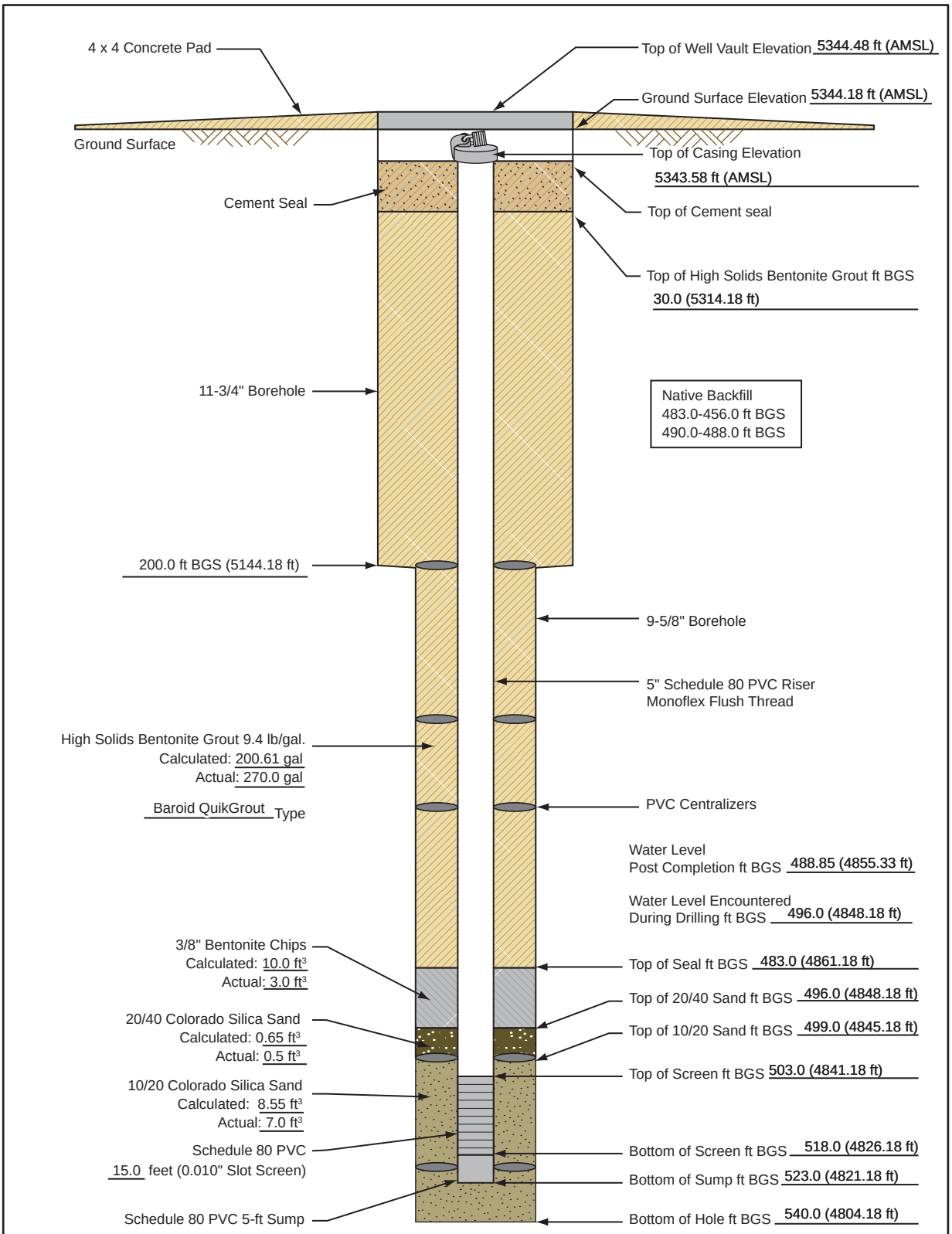


| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 540 | | | | | | | | |
| 545 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; medium dense; 95% fine to very coarse sand; 5% fine gravel to 8mm; rounded. | SW | Native Backfill | Total Depth @ 1157.<br>Added ~ 100 gal. during drilling.<br>Added 500 gal. to flood hole.<br>600 gal. total. |
| 550 | | | | | | | | |
| 555 | | | | | | | | |
| 560 | | | | | | | | |
| 565 | | | | | | | | |
| 570 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:41 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Monitoring Well Completion Diagram KAFB-106208

Installation Start Date/Time: 8/13/2012
Installation End Date/Time: 8/16/2012




** Sand had to be blown out and replaced*

(4,816.90) = *Elevations are NAVD 88 Datum values based on NGS Control Station "Hanger", Elevation = 5,343.43 ft. GPS/RTK methods and GEO1D99 model were used to determine elevations of all surveyed points.*

*Not to Scale*
*BGS = Below Ground Surface*

140705.CB010133_MW_KAFB_106208.A4

Shaw Environmental, Inc.

# Well Development Record

**Project Name**: KAFB BFF

**Location**: Mesilla

**Well/Piez. No.**: KAFB-106208

**Personnel**: V. Bracht

**Date Installed**: 8/16/12

**Date**: 9/11/12

**Csg. Diameter (I.D.)**: 5"

**Samplers**: N/A

**Total Depth (ft. BGL)**: 523

**Method of Development**:

X Surging X Bailing X Pumping

X Original Development ☐Redevelopment ☐Other

**Development Date**: 9/11/12

**Depth to Water Before Developing Well (ft. BGL)**: 490.93

| | | | Vol. (V) | | Purge Factor | | Volume to Purge |
|---|---|---|---|---|---|---|---|
| **Height of Water Column**: | feet = | 49.70 | gal. | * | 1 | = | 49.70 |

**$V=(B * r_c^2 * L_c * 7.48)+(B * (r_w^2 - r_c^2) * L_s * Ø_s * 7.48)+(H_2O$ added during drilling/installation) =** 649.7 gallons

**Depth Purging From**: 506 feet

**Time Purging Begins**: 1034, 9/11/12

**Weather**: Sunny, Warm

**Screened Interval (ft BGL)**: 503 - 518

**Equipment Nos.**: **pH Meter:** LVE 002686

**EC Meter**: LVE 002686

**Turbidity Meter**: LVE002384

**Equipment Decontaminated Prior to Development**: Y X N

**Describe**: Steam Cleaned

**Collected Sample of Water Added to Well**: Y N X

**Describe**: N/A

**Comment**: 600 gallons of water added during drilling/well installation activities

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp.°C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 9/11/2012 | 1034 | 490.13 | 10 | 21.30 | 6.91 | 0.000* | >1000 | Begin Bailing; Water is Muddy Brown |
| 9/11/2012 | 1045 | - - | 45 | 21.00 | 7.75 | 0.000* | >1000 | Continue Bailing; Water is Muddy Brown |
| 9/11/2012 | 1100 | - - | 75 | 20.80 | 7.87 | 0.003* | >1000 | Continue Bailing; Water is Muddy Brown |
| 9/11/2012 | 1110 | - - | 100 | - - | - - | - - | - - | Bailed |
| 9/11/2012 | 1240 | 490.05 | - - | 21.60 | 7.54 | 0.469 | 924.00 | Begin Pumping at 10 GPM |
| 9/11/2012 | 1245 | 492.00 | 200 | 20.50 | 7.56 | 0.450 | 36.90 | Water is Slightly Cloudy |
| 9/11/2012 | 1250 | 492.27 | 275 | 20.60 | 7.59 | 0.438 | 14.90 | Water is Fairly Clear |
| 9/11/2012 | 1255 | 492.29 | 300 | 20.50 | 7.59 | 0.433 | 12.60 | Water is Fairly Clear |
| 9/11/2012 | 1300 | 492.31 | 350 | 20.60 | 7.59 | 0.429 | 10.40 | Water is Fairly Clear |
| 9/11/2012 | 1305 | 492.33 | 400 | 20.60 | 7.59 | 0.424 | 7.70 | Water is Clear |

Notes:
* Water Levels - Reported to the nearest 0.01 foot
* pH - Reading rounded to 0.1 pH units
* Water temperature - Reported to nearest 0.1C
* Turbidity report in NTV nearest whole #
GPM = Gallons Per Minute

Where:
B=3.14
$Ø_s$= porosity of the sand pack
$r_c$= radius of the well casing and screen in feet
$L_c$= length of water column inside the casing and screen in feet
$r_w$= radius of the well bore in feet
$L_s$= length of saturated portion of the sand pack in feet
7.48 gallons/cubic foot= conversion from cubic feet to gallons

Shaw Environmental, Inc.

# Well Development Record

**Project**: KAFB BFF

**Well No**: KAFB-106208

**Project Number**: 140705

**Samplers**: N/A

**Date**: 9/11/12

**Checked By**: N/A

**Time Start**: 1034, 9/11/12

**Time Finish**: 1330, 9/11/12

Field Chemistry (cont'd)

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp °C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 9/11/2012 | 1310 | 493.35 | 450 | 20.50 | 7.58 | 0.422 | 5.58 | Water is Clear |
| 9/11/2012 | 1315 | 493.37 | 500 | 20.40 | 7.64 | 0.419 | 4.11 | Water is Clear |
| 9/11/2012 | 1320 | 493.38 | 550 | 20.50 | 7.65 | 0.415 | 3.45 | Water is Clear |
| 9/11/2012 | 1325 | 493.40 | 600 | 20.60 | 7.64 | 0.413 | 2.81 | Water is Clear |
| 9/11/2012 | 1330 | 493.41 | 650 | 20.60 | 7.62 | 0.408 | 2.63 | Water is Clear; Pump off; Total Removed |

* Due to sample cup design, the YSI Professional Plus does not accurately measure EC from the cup. Sample cup works well in a flow-through set-up, once pumping begins.

**Was well sampled after development?** YES NO X

**Sample Method**: N/A

**Sample Name**: N/A

**Analyses**: N/A

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | Disturbed from air knife utilities check | | Top of Cement Seal | 0833 begin; 0837 stop. see FADL; 7-18-2012 0815 begin. |
| 5 | | | | | | | | |
| 10 | | | | | Poorly graded GRAVEL with silt (GP/GM); reddish brown (5YR 5/4); damp; very loose; 70% gravel; 3 to 60 mm; angular to subrounded; 10% very fine to very coarse sand; 10% fines (silt). | GP-GM | | Injecting water for dust control. |
| 15 | | | | | Silty SAND with gravel (SM); reddish brown (5YR 5/4); wet; very loose; 60% fine to coarse sand; 15% gravel; 3 to 10 mm; subangular to subrounded; max 10 mm; 15% fines (silt). | SM | Cement Seal | End @ 0832. Begin @ 0841. |
| 20 | | | | | Silty SAND (SM); yellowish red (5YR 5/6); wet; very loose; 60% fine to coarse sand; 5% gravel; 3 - 12 mm; angular to subangular; max 12 mm; 25% silt, 10% clay. | | | 0845. Pause - portable air compressor being added. Begin @ 0857. |
| 25 | | | | | Unable to log 25 - 35 ft bgs. | | | Driller attempting to dry casing; cuttings retrieved are mixed with wet cuttings from above. |
| 30 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 30 | | | | | Unable to log 25 - 35 ft bgs. | | | |
| 35 | | | | | See above | | | End @ 0927. Begin @ 0935. |
| 40 | | | | | | | Top of High Solids Bentonite Grout | |
| | | | | | Well graded SAND (SW); reddish brown (5YR 4/3); moist; loose; 95% sand; 5% gravel; 3 - 5 mm, subangular to subrounded, max 5 mm. | SW | | |
| 45 | | | | | Silty SAND (SM); reddish brown (5YR 5/3); moist; loose; no gravel; 80% fine to coarse sand; 20% fines (silt). | | | |
| 50 | | | | | see FADL 0945 | SM | | |
| 55 | | | | | | | High Solids Bentonite Grout | |
| | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; no gravel; 70% very fine to very coarse sand; 30% fines (silt). | | | End @ 0958. Begin @ 1005. |
| 60 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 60 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 69% very coarse to very fine sand; 1% gravel; 3 - 8 mm, subangular to subrounded; max 8 mm; 30% fines (silt). | | | |
| 65 | | | | | Silty SAND with gravel (SM); red (2.5YR 4/8); moist; loose; 45% very fine to coarse sand (well graded); 15% gravel; 3 - 10 mm, angular to subrounded; max 12 mm; 30% silt; 10% clay. | | | |
| 70 | | | | | Silty SAND (SM); red (2.5YR 4/8); moist; loose; 55% very fine to coarse sand; 5% gravel, 3 - 10 mm, angular to subangular; max 12 mm; 25% silt; 15% clay. | | High Solids Bentonite Grout | |
| 75 | | | | | Silty SAND (SM); red (2.5YR 4/8); moist; loose; 54% very fine to medium sand; 5% very coarse to coarse sand; 1% gravel; 3 - 8 mm, angular; 25% silt; 15% clay. | SM | | End @ 1025.<br>Begin @ 1033. |
| 80 | | | | | Silty SAND (SM); red (2.5YR 4/8); moist; loose; 52% very fine to medium sand; 3% coarse to very coarse sand; 20% silt; 20% clay. | | | |
| 85 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; 60% very fine to coarse sand, 3% very coarse sand; 30% silt; 10% clay. | | | |
| 90 | | | | | | | | |

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# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 90 | | | | | Silty SAND (SM); red (2.5YR 4/6); moist; loose; no gravel; 55% very fine to medium sand; 3% very coarse to coarse sand; 45% fines (silt). | | | |
| 95 | | | | | Same as above | SM | | End @ 1050.<br>7-19-2012.<br>Begin @ 1230. |
| 100 | | | | | Clayey SAND (SC); yellowish red (5YR 4/6); moist; loose; no gravel; 75% fine to medium sand; 10% silt; 15% clay. | SC | | |
| 105 | | | | | Silty SAND (SM); red (2.5 YR 4/6); moist; loose; no gravel; 60% fine to medium sand; 30% silt; 10% clay. | | High Solids Bentonite Grout | |
| 110 | | | | | Silty SAND (SM); red (2.5 YR 4/6); moist; loose; no gravel; 60% fine to medium sand; 10% very coarse to coarse sand; 35% silt; 5% clay. | SM | | |
| 115 | | | | | Silty SAND (SM); yellowish red (5YR 4/6); moist; loose; no gravel; 85% very fine to coarse sand; 15% fines (silt). | | | End @ 1248.<br>Adding water to clean out discharge. hose.<br>Begin @ 1318. |
| 120 | | | | | | | | |

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# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 120 | | | | | No recovery | | | |
| 125 | | | | | Silty SAND (SM); no color; wet; loose; 50% very fine to medium sand; 30% silt; 20% clay. | SM | | |
| 130 | | | | | Clayey SAND (SC); no color; wet; loose; 50% very fine to medium sand; 20% silt; 30% clay. | SC | | |
| 135 | | | | | Silty SAND (SM); no color; wet; loose; 49% very fine to medium sand; 1% coarse to very coarse sand; 40% silt; 10% clay. | SM | High Solids Bentonite Grout | End @ 1354. Begin @ 1405. |
| 140 | | | | | Silty SAND (SM); no color; wet; loose; 65% very fine to very coarse sand; 25% silt; 10% clay. | | | |
| 145 | | | | | Silty SAND (SM); no color; wet; loose; 40% very fine to medium sand; 15% coarse to very coarse sand; 10% gravel; 3 - 40 mm, subangular to rounded; max 50 mm; 30% silt; 5% clay. | | | |
| 150 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 150 | | | | | Silty SAND (SM); no color; wet; loose; 60% very fine to medium sand; 30% silt; 10% clay. | | | |
| 155 | | | | | Silty SAND (SM); no color; wet; loose; 50% very fine to fine sand; 20% medium sand; 40% silt; 10% clay. | SM | | End @ 1420.<br>Begin @ 1432. |
| 160 | | | | | Silty SAND (SM); no color; wet; loose; 50% very fine to fine sand; 50% fines (silt). | | High Solids Bentonite Grout | |
| 165 | | | | | Same as above | | | |
| 170 | | | | | Clayey SAND (SC); no color; wet; loose; 60% very fine to fine sand; 40% fines (clay); low to medium plasticity. | SC | | |
| 175 | | | | | Silty SAND (SM); no color; wet; loose; 50% very fine to fine sand; 50% fines (silt). | SM | | End @ 1450.<br>Begin @ 1505. |
| 180 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
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X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 180 | | | | | | | | |
| | | | | | No recovery | | | |
| 185 | | | | | | | | |
| | | | | | Clayey SAND (SC); no color; wet; loose; 59% very fine to medium sand; 1% gravel; 3 - 10 mm; subangular; max 10 mm; 30% clay; 10% silt. | SC | |
| 190 | | | | | | | | |
| | | | | | No recovery | | High Solids Bentonite Grout | |
| 195 | | | | | | | | |
| | | | | | Silty SAND (SM); no color; wet; loose; 75% very fine to coarse sand; 25% fines (silt). | SM | | End @ 1528. Begin @ 1543. Pushing drive casing flush to ground surface 200 ft bgs. |
| 200 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); yellowish red (5YR 4/6); moist; loose; 95% fine to coarse sand; 5% fines (coarse fraction is pumice). | SP | | 7-20-12. Begin @ 1220. |
| 205 | | | | | | | | |
| | | | | | Poorly graded SAND (SP); yellowish red (5YR 4/6); moist; loose; 94% fine to coarse sand; 1% gravel; 3 - 10 mm; angular to subrounded; max 12 mm; 5% fines. Note: coarse fraction of sand is pumice. | | | |
| 210 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
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Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 210 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); dry; loose; 95% very fine to medium sand; 5% fines. | SP | | |
| 215 | | | | | Well graded SAND with gravel (SW); reddish brown (5YR 5/4); dry; loose; 85% sand; 15% gravel; 3 - 10 mm; angular to subrounded; max 10 mm. | SW | | End @ 1230. Begin @ 1236. |
| 220 | | | | | Well graded SAND with gravel (SW); reddish brown (5YR 4/4); dry; loose; 75% sand; 25% gravel; 3 - 10 mm; subangular to subrounded; max 10 mm. | SW | High Solids Bentonite Grout | |
| 225 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); dry; loose; 95% very fine to medium sand; 5% fines. | SP | | |
| 230 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); moist; loose; 1% gravel; 3 - 5 mm; subangular; max 5 mm; 94% very fine to medium sand; 1% coarse to very coarse sand; 5% fines. | SP | | |
| 235 | | | | | Poorly graded SAND with silt (SP-SM); reddish brown (5YR 4/3); moist; loose; 90% very fine to medium sand; 10% fines (silt). | SP-SM | | End @ 1248. Begin @ 1254. |
| 240 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 240 | | | | | Poorly graded SAND with silt (SP-SM); reddish brown (5YR 4/3); moist; loose; 90% very fine to medium sand; 10% fines (silt). | SP-SM | | |
| 245 | | | | | Poorly graded GRAVEL with sand (GP); dry; loose; 70% gravel; 3 - 20 mm; angular to subrounded; max 22 mm; 30% fine to very coarse sand; Note; gravel contains quartzite; limestone; basalt and granitic clasts. | GP | | |
| 250 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); moist; loose; 100% fine to coarse sand. | SP | High Solids Bentonite Grout | |
| 255 | | | | | Poorly graded SAND with gravel (SP); reddish brown (5YR 5/3); moist; loose; 85% fine to very coarse sand; 15% gravel; 3 - 8 mm; subangular to subrounded; max 8 mm; Note: pumice clasts throughout grain size. | | | End @ 1306. Begin @ 1311. |
| 260 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/3); dry; loose; 85% very fine to medium sand; 10% coarse to very coarse sand; 5% fines. Note: coarse fraction is pumice. | | | |
| 265 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); moist; loose; 92% very fine to coarse sand; 3% gravel; 3 - 5 mm; subrounded; max 5 mm; 5% fines. | | | |
| 270 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 270 | | | | | Well graded SAND (SW); reddish brown (5YR 5/4); moist; loose; 90% sand; 10% gravel; 3 - 8 mm; subangular to subrounded; max 8 mm; Note: pumice throughout. | SW | | |
| 275 | | | | | Poorly graded SAND (SP); reddish brown (5YR 4/4); damp; loose; 95% fine to very coarse sand; 5% gravel; 3 - 5 mm; subangular to subrounded; max 8 mm. | | | End @ 1324.<br>Begin @ 1332. |
| 280 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; loose; 100% fine to coarse sand. | | High Solids Bentonite Grout | |
| 285 | | | | | Poorly graded SAND with gravel (SP); reddish brown (5YR 5/4); moist; loose; 80% fine to very coarse sand; 20% gravel; 3 - 10 mm; subangular to rounded; max 10 mm. | SP | | |
| 290 | | | | | Poorly graded SAND (SP); reddish brown (5YR 5/4); moist; loose; 85% very fine to very coarse sand; 10% gravel; 3 - 10 mm; angular to subrounded; max 15 mm; 5% fines. | | | |
| 295 | | | | | Same as above (290 ft). | | | End @ 1343.<br>Begin @ 1350. |
| 300 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 300 | | | | | Poorly graded SAND with gravel (SP); reddish brown (5YR 5/4); moist; loose; 85% fine to very coarse sand; 15% gravel; 3 - 8 mm; subangular to subrounded; max 8 mm. | SP | | |
| 305 | | | | | Poorly graded SAND with silt (SP-SM); brown (7.5YR 5/3); moist; loose; 90% very fine to very coarse sand; 10% fines (silt). | SP-SM | | |
| 310 | | | | | Poorly graded SAND with silt (SP-SM); brown (7.5YR 5/4); moist; loose; 90% very fine to medium sand; 10% fines (silt). | | High Solids Bentonite Grout | |
| 315 | | | | | Poorly graded SAND (SP); brown (7.5YR 5/4); moist; loose; 95% fine to coarse sand; 5% fines. | SP | | End of day @ 1408. Begin 7-23-12 @ 0855. J. Tarbert logging. |
| 320 | | | | | Same as above (315 ft); trace fine gravel to 2 cm. | | | |
| 325 | | | | | Same as above (315 ft). | | | |
| 330 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 330 | | | | | Well graded SAND (SW); pale brown (10YR 6/3); moist; medium dense; 95% very fine to very coarse sand; 5% fine gravel to 1.3 cm; rounded | SW | | Adding water for dust control. |
| 335 | | | | | Same as above (330 ft); 10% fine gravel to 3.1 cm | | | Depth @ 0921. Begin @ 0931. |
| 340 | | | | | Poorly graded SAND (SP); brown (7.5YR 4/4); moist; medium dense; 100% very fine to medium sand; 1 mm; rounded | SP | High Solids Bentonite Grout | |
| 345 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; medium dense; 90% very fine to very coarse sand; 10% fine gravel to 1 cm; rounded. | SW | | |
| 350 | | | | | Same as above (345 ft); grading finer; 5% fine gravel | | | |
| 355 | | | | | Same as above (350 ft). | | | Depth @ 0945. |
| 360 | | | | | | | | |

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# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 360 | | | | | Well graded SAND (SW); brown (10YR 5/3); dry; medium dense; 95% very fine to very coarse sand; 5% fine gravel to 1 cm, rounded. | | | Begin @ 0955. |
| 365 | | | | | Same as above (350 ft); 10% fine gravel to 4 cm. | | | |
| 370 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); moist; medium dense; 70% very fine to very coarse sand; 30% fine gravel to 3.5 cm, well rounded. | SW | High Solids Bentonite Grout | |
| 375 | | | | | Same as above (370 ft). | | | Depth @ 1015.<br>Begin @ 1030. |
| 380 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; loose; 100% very fine to medium sand; 1.5 mm, rounded. | SP | | |
| 385 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; medium dense; 95% very fine to very coarse sand; 5% fine gravel to 1.2 cm; rounded. | SW | | |
| 390 | | | | | | | | |

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# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 390 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; medium dense; 95% very fine to very coarse sand; 5% fine gravel to 1.2 cm; rounded. | SW | | |
| 395 | | | | | Same as above (385 ft); gravel to 4 cm. | | | Depth @ 1052.<br>Begin @ 1058. |
| 400 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; medium dense; 100% fine to medium sand; 2 mm, rounded. | SP | High Solids Bentonite Grout | Water for dust control. |
| 405 | | | | | Well graded SAND with gravel (SW); brown (10YR 4/3); moist; medium dense; 80% very fine to very coarse sand; 20% fine gravel to 1.3 cm; rounded. | SW | | |
| 410 | | | | | No recovery. | | | |
| 415 | | | | | Same as above (403 ft); 15% fine gravel. | SW | | Depth @ 1123. |
| 420 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 420 | | | | | Well graded SAND with gravel (SW); brown (10YR 4/3); moist; medium dense; 80% very fine to very coarse sand; 20% fine gravel to 1.3 cm; rounded. | | | Begin @ 1317. |
| 425 | | | | | Same as above (403 ft). | | High Solids Bentonite Grout | |
| 430 | | | | | Same as above (403 ft). | SW | | |
| 435 | | | | | Same as above (403 ft); overall finer. | | | End @ 1343. Begin @ 1347. |
| 440 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; medium dense; 100% fine to medium sand; trace fine gravel to 8 mm, rounded. | SP | | |
| 445 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; medium dense; 95% fine to very coarse sand; 5% fine gravel to 2.3 cm, rounded. | SW | | |
| 450 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 450 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; medium dense; 95% fine to very coarse sand; 5% fine gravel to 2.3 cm, rounded. | SW | | |
| 455 | | | | | Same as above (445 ft); well graded SAND with gravel (SW); 80% sand; 20% gravel to 1.7 cm. | | | Depth @ 1414. Resume @ 1427. |
| 460 | | | | | Same as above (455 ft); 25% gravel. | | High Solids Bentonite Grout | |
| 465 | | | | | Same as above (455 ft); 25% gravel. | | | |
| 470 | | | | | No recovery | | | Air line likely clogged with sediment. Pause to clean cyclone. |
| 475 | | | | | No recovery | | | Depth @ 1453. Resume @ 1458. |
| 480 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 480 | | | | | No recovery | | | Adding water to lift cuttings. |
| 485 | | | | | Well graded SAND (SW); brown (10YR 5/3); moist; medium dense; 95% very fine to very coarse sand; 5% fine gravel. | SW | High Solids Bentonite Grout | 1600 Hydraulic line to hammer broke, will have to replace. End 7-23-12. Begin 7-24-12 @ 0809. Water level encountered during drilling and after drilling. |
| 490 | | | | | Poorly graded SAND (SP); brown (10YR 5/3); moist; medium dense; 95% medium to coarse sand; 5% fine gravel to 2.8 cm, rounded. | SP | | |
| 495 | | | | | Same as above (490 ft). | | | Depth @ 0824. Begin @ 1124. |
| 500 | | | | | Silty SAND (SM); brown (7.5YR 4/4); wet; medium dense; 85% fine to medium sand; 1 mm, rounded; 15% silt. | SM | Top of Bentonite Seal | |
| 505 | | | | | Same as above (500 ft). | | 5" Schedule 80 PVC Riser | |
| 510 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 510 | | | | | Silty SAND (SM); brown (7.5YR 4/4); wet; medium dense; 85% fine to medium sand; 1 mm, rounded; 15% silt. | | | |
| 515 | | | | | Same as above (500 ft). | SM | | Depth @ 1146. Resume @ 1312. |
| 520 | | | | | Same as above (500 ft); coarser; fine to coarse sand. | | Bentonite Seal | |
| 525 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; medium dense; 95% fine to very coarse sand; 5% fine gravel to 1.3 cm; rounded. Note: gravel lense from 527 to 529 ft. | SW | | |
| 530 | | | | | Silty SAND (SM); brown (10YR 5/3); wet; medium dense; 80% fine to medium sand; 2 mm; rounded; 20% silt. | | | |
| 535 | | | | | Same as above (530 ft); trace fine gravel to 3 cm. | SM | | Depth @ 1341. Resume @ 1344. |
| 540 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 540 | | | | | Silty SAND (SM); brown (10YR 5/3); wet; medium dense; 80% fine to medium sand; 2 mm; rounded; 20% silt. | SM | | |
| 545 | | | | | Poorly graded SAND with gravel (SP); brown (10YR 5/3); wet; dense; 60% medium to very coarse sand; 40% fine gravel to 2 cm, rounded. | SP | | |
| 550 | | | | | Well graded SAND (SW); brown (10YR 5/3); wet; dense; 90% fine to very coarse sand; 10% fine gravel to 2.2 cm, rounded; trace lean clay nodules. | SW | Bentonite Seal | Added ~100 gallons water. |
| 555 | | | | | Silty SAND (SM); brown (10YR 5/3); wet; dense; 70% fine to medium sand; 1 mm, rounded; 30% silt. | SM | | Depth @ 1423. Begin @ 1435. |
| 560 | | | | | Same as above (555 ft). | | | |
| 565 | | | | | Well graded SAND with gravel (SW); pale brown (10YR 6/3); wet; dense; 85% fine to very coarse sand; 15% fine gravel to 1.7 cm, rounded. | SW | | |
| 570 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
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Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 570 | | | | | Well graded SAND with gravel (SW); pale brown (10YR 6/3); wet; dense; 85% fine to very coarse sand; 15% fine gravel to 1.7 cm, rounded. | | | |
| 575 | | | | | Same as above (562 ft); trace silt. | SW | | Depth @ 1513. Begin @ 1520. |
| 580 | | | | | Silty SAND (SM); brown (10YR 5/3); wet; dense; 80% fine to medium sand; 1 mm, rounded; 20% silt. | SM | Bentonite Seal | |
| 585 | | | | | Poorly graded SAND (SP); grayish brown (10YR 5/2); wet; dense; 95% fine to medium sand; 1 mm, rounded; 5% silt. | SP | | |
| 590 | | | | | No recovery. | | | |
| 595 | | | | | Same as above (585 ft); 90% sand; 5% fine gravel to 2.2 cm; 5% silt. | SP | Top of 20/40 Sand<br>Top of 10/20 Sand | Depth @ 1600. Begin @ 1608. |
| 600 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Borehole ID: KAFB-106209

Client: **US Army Corps of Engineers**
Project Location: KAFB, Albuquerque, NM
Date Started: 7/17/2012
Date TD Reached: 7/25/2012
Date Completed: 8/7/2012
Ground Elevation AMSL (ft): 5343.8
Y Coordinate: 1480204.26
X Coordinate: 1546034.28

Project Name: KAFB BFF SWMU ST-106 and SS-111
Project Number: 140705
Hole Diameter Upper (in.): 11-3/4
Hole Diameter Lower (in.) 9-5/8
Groundwater Levels BGS (ft):
At Time of Drilling: 488.00
At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert



| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 600 | | | | | Silty SAND (SM); grayish brown (10YR 5/2); wet; dense; 70% fine to medium sand; 2 mm, subrounded; 30% silt. | SM | | |
| 605 | | | | | Well graded SAND with gravel (SW); brown (10YR 5/3); wet; dense; 80% fine to very coarse sand; 20% fine gravel to 4.5 cm, subrounded. | SW | Top of 5" Schedule 80 PVC 0.010" Slot Screen | |
| 610 | | | | | Same as above (602 ft); 5% silt. | | | Stopped 7-24-12 @ 1645. Resume 7-25-12 @ 0825. |
| 615 | | | | | Well graded SAND with silt (SW-SM); grayish brown (10YR 5/2); wet; dense; 90% fine to coarse sand; 10% silt; trace fine gravel to 1 cm, rounded. | SW-SM | Bottom of 5" Schedule 80 PVC 0.010" Slot Screen | Depth @ 0900. Resume @ 1102. |
| 620 | | | | | Same as above (615 ft). | | Sump | |
| | | | | | | | Bottom of Sump | |
| 625 | | | | | Same as above (615 ft). | | | |
| 630 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

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Hole Diameter Lower (in.) 9-5/8
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At End Of Drilling: N/A
After Drilling: 487.65
Drillling Contractor: Yellow Jacket
Drilling Method: Air Rotary Casing Hammer
Logged By: Patrick Ostrye/Jason Tarbert

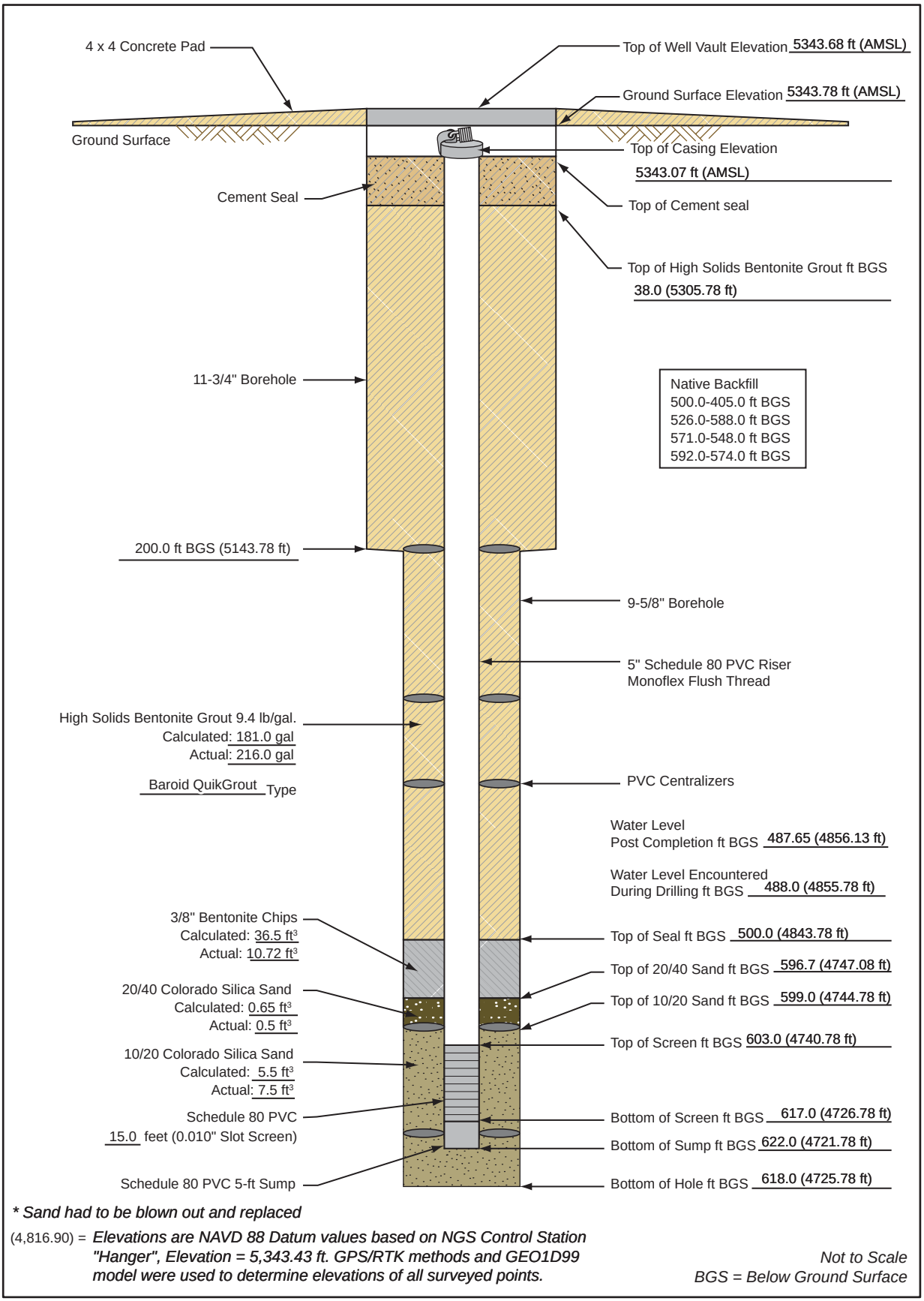


| Depth (ft) | Sample Type | Number | Headspace PID | Lithologic Log | Material Description | U.S.C.S. | Well Diagram | Remarks |
|---|---|---|---|---|---|---|---|---|
| 630 | | | | | Well graded SAND with silt (SW-SM); grayish brown (10YR 5/2); wet; dense; 90% fine to coarse sand; trace fine gravel to 1 cm, rounded; 10% silt. Slightly coarser than at 615 ft. | | | |
| 635 | | | | | Same as above (615 ft). | SW-SM | | |
| 640 | | | | | Well graded SAND (SW); grayish brown (10YR 5/2); wet; dense; 95% fine to very coarse sand; 5% gravel to 4.5 cm, well rounded; trace silt. | SW | | Depth @ 1135. |
| 645 | | | | | | | | |
| 650 | | | | | | | | |
| 655 | | | | | | | | |
| 660 | | | | | | | | |

KAFB_BOREHOLE_LOG - SHAW_DRILLING.GDT - 10/16/12 12:48 - N:\KAFB BFF\GINT\KAFB_PROJECT\KAFB_BFF.GPJ

# Monitoring Well Completion Diagram KAFB-106209

Installation Start Date/Time: 7/26/2012 @ 08:33
Installation End Date/Time: 8/07/2012 @ 12:30




** Sand had to be blown out and replaced*

(4,816.90) = *Elevations are NAVD 88 Datum values based on NGS Control Station "Hanger", Elevation = 5,343.43 ft. GPS/RTK methods and GEO1D99 model were used to determine elevations of all surveyed points.*

*Not to Scale*
*BGS = Below Ground Surface*

140705.CB010133_MW_KAFB_106209.A5

Shaw Environmental, Inc.

# Well Development Record

**Project Name**: KAFB BFF

**Location**: Mesilla and Southern

**Well/Piez. No.**: KAFB-106209

**Personnel**: V. Bracht

**Date Installed**: 8/7/12

**Date**: 9/10/12

**Csg. Diameter (I.D.)**: 5"

**Samplers**: N/A

**Total Depth (ft. BGL)**: 622

**Method of Development**:

X Surging X Bailing X Pumping

X Original Development ☐Redevelopment ☐Other

**Development Date**: 9/10/12

**Depth to Water Before Developing Well (ft. BGL)**: 490.80

| | | Vol. (V) | | Purge Factor | | Volume to Purge |
|---|---|---|---|---|---|---|
| **Height of Water Column**: | feet = | 149.54 | gal. * | 1 | = | 149.54 |

**V=(B * $r_c^2$ * $L_c$ * 7.48)+(B * ($r_w^2$ - $r_c^2$) * $L_s$ * $Ø_s$ * 7.48)+($H_2O$ added during drilling/installation) =** 1299.54 gallons

**Depth Purging From**: 603 feet

**Time Purging Begins**: 0945, 9/10/12

**Weather**: Cloudy, Cool

**Screened Interval (ft BGL)**: 603 - 617

**Equipment Nos.**: **pH Meter:** LVE 002686

**EC Meter**: LVE 002686

**Turbidity Meter**: LVE002384

**Equipment Decontaminated Prior to Development**: Y X N

**Describe**: Steam Cleaned

**Collected Sample of Water Added to Well**: Y N X

**Describe**: N/A

**Comment**: 1150 gallons of water added during drilling/well installation activities

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp.°C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 9/10/2012 | 0945 | 490.15 | 15 | 22.30 | 7.35 | 0.005* | 393.00 | Begin Bailing; Water is Brown |
| 9/10/2012 | 1012 | - - | 55 | 21.30 | 7.90 | 0.005* | >1000 | Continue Bailing; Water is Brown |
| 9/10/2012 | 1025 | - - | 90 | 21.00 | 7.90 | 0.005* | 643.00 | Continue Bailing; Water is Very Cloudy; Bubbles |
| 9/10/2012 | 1030 | - - | 100 | - - | - - | - - | - - | Bailed |
| 9/10/2012 | 1304 | 490.01 | - - | - - | - - | - - | - - | Pump Starts and Shuts off |
| 9/10/2012 | 1344 | 491.02 | - - | 23.10 | 7.61 | 0.313 | 69.70 | Begin Pumping |
| 9/10/2012 | 1355 | 491.02 | 200 | 21.70 | 7.80 | 0.290 | 27.80 | Water is Cloudy |
| 9/10/2012 | 1405 | 491.00 | 300 | 21.70 | 7.64 | 0.297 | 16.20 | Water is Fairly Clear |
| 9/10/2012 | 1415 | 491.03 | 400 | 21.40 | 7.68 | 0.291 | 19.20 | Water is Fairly Clear |
| 9/10/2012 | 1425 | 491.03 | 500 | 22.90 | 7.72 | 0.298 | 9.37 | Water is Clear |

Notes:
* Water Levels - Reported to the nearest 0.01 foot
* pH - Reading rounded to 0.1 pH units
* Water temperature - Reported to nearest 0.1C
* Turbidity report in NTV nearest whole #
GPM = Gallons Per Minute

Where:
B=3.14
$Ø_s$= porosity of the sand pack
$r_c$= radius of the well casing and screen in feet
$L_c$= length of water column inside the casing and screen in feet
$r_w$= radius of the well bore in feet
$L_s$= length of saturated portion of the sand pack in feet
7.48 gallons/cubic foot= conversion from cubic feet to gallons

Shaw Environmental, Inc.

# Well Development Record

**Project**: KAFB BFF

**Well No**: KAFB-106209

**Project Number**: 140705

**Samplers**: N/A

**Date**: 9/10/12

**Checked By**: N/A

**Time Start**: 0945, 9/10/12

**Time Finish**: 1535, 9/10/12

Field Chemistry (cont'd)

| Date | Time | Water Level (ft. Below TOC) | Volume Removed (gal.) | Temp °C | pH | EC (ms/cm) | Turbidity N.T.U. | Comments |
|---|---|---|---|---|---|---|---|---|
| 9/10/2012 | 1435 | 491.03 | 600 | 21.70 | 7.58 | 0.292 | 6.45 | Water is Clear |
| 9/10/2012 | 1445 | 491.02 | 725 | 21.40 | 7.61 | 0.287 | 6.14 | Water is Clear |
| 9/10/2012 | 1455 | 491.02 | 850 | 21.30 | 7.71 | 0.270 | 3.71 | Water is Clear |
| 9/10/2012 | 1510 | 490.95 | 1000 | 21.00 | 7.79 | 0.309 | 7.56 | Water is Clear |
| 9/10/2012 | 1518 | 491.01 | 1100 | 21.10 | 7.82 | 0.307 | 2.66 | Water is Clear |
| 9/10/2012 | 1525 | 491.00 | 1200 | 21.20 | 7.82 | 0.301 | 4.08 | Water is Clear |
| 9/10/2012 | 1535 | 491.00 | 1300 | 21.10 | 7.82 | 0.298 | 2.28 | Water is Clear; Pump off; Total Removed |

* Due to sample cup design, the YSI Professional Plus does not accurately measure EC from the cup. Sample cup works well in a flow-through set-up, once pumping begins.

**Was well sampled after development?** YES NO X

**Sample Method**: N/A

**Sample Name**: N/A

**Analyses**: N/A