SHEET 1 of 3

SOIL BORING LOG

| | <u> </u> | <u> </u> | ntermed | iate Aquifer Inv. | LOCATION: Memphis, Tennessee | ELEVATION: | |
|--|------------|----------|-------------|---|---|---|-------|
| | G CONTRA | | | Boart Longyear | | NAME OF DRILLER: T. Schmalfeldt / C. Hei | |
| | G METHOD | | | Canterra CT 250 Mud Rotary (M) / SR 120 Track-Mounted Rotasonic (R) | | SIZE/TYPE OF BIT: 17.25" (M) / 4X6"; 9.25" | ' (R) |
| | RDEN THIC | | | | DINTO ROCK N/A | TOTAL DEPTH OF BORING 176 ft-bgs | |
| WATER LEVELS : XXX ft-bgs DEPTH BELOW SURFACE (FT) | | | js <u> </u> | • | (M); 9/16/07 (R) / END: 9/13/07 (M); 9/17/07 (R) SOIL DESCRIPTION | LOGGER: Derek Miller/ORO COMMENTS | |
| | | . , | -\ | STANDARD | SOIL DESCRIPTION | COMMENTS | |
| | SAMPLE INT | | | PENETRATION | COLL NAME TIOOG OBOUR SYMPOL COLOR | DEDTIL OF CACING DRILLING DATE | |
| | | RECOVER | #/TYPE | TEST RESULTS | SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, | DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, | |
| | | | #/116 | 6"-6"-6" | | TESTS, AND INSTRUMENTATION. | |
| | | | | (N) | OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY. | FID (ppm) | |
| | | | | | 0.0-85.0: NOT SAMPLED | 0.0-85.0: MUD ROTARY RIG DID NOT BEGIN | |
| _ | | | | | | SAMPLING UNTIL 85.0 FT BGS | _ |
| - | | | | | | *REFERENCE MW-159 BORING LOG | _ |
| _ | 0-85 | N/A | N/A | N/A | | THE ETIENCE NIW-139 BOTTING EGG | _ |
| _ | 00-0 | IN/A | IV/A | IV/A | | | _ |
| - | | | | | | | _ |
| | | | | | | | _ |
| 85 | | | | | OF A OT A OUTTY OAND MY TRACE OR AVEL (ON) | MAY FIR ON OORF A A | |
| _ | | | | | 85.0-87.0: SILTY SAND W/ TRACE GRAVEL (SM), yellowish brown, wet, loose, fine to medium-grained sand, gravels up | MAX FID ON CORE: 0.9 | _ |
| _ | 85-87 | 0.8 / 2 | SS-1 | N/A | to 1/2", chert, round, ~15% silt | | _ |
| - | ammannan | | amanana | | | | _ |
| - | | | | | | 87.0-94.0: MUD ROTARY RIG DID NOT SAMPLE DUE TO SIMILAR LITHOLOGY OF | _ |
| _ | | | | | | ADJACENT MONITORING WELL | _ |
| _ | | | | | | *DEFEDENCE MIN 450 DODING LOO | _ |
| 90 - | | | | | | *REFERENCE MW-159 BORING LOG | _ |
| | 87-94 | N/A | N/A | N/A | | | _ |
| - | | | | | | | _ |
| - | | | | | | | _ |
| _ | | | | | | | _ |
| - | | | | | | | _ |
| - | | | | | | | _ |
| | | | | | 94.0-96.0: AS ABOVE, gravel ~10% | MAX FID ON CORE: 0.0 | _ |
| 95 | 94-96 | 0.4 / 2 | SS-2 | N/A | | | |
| _ | | | | | | | _ |
| _ | | | | | 96.0-97.5: AS ABOVE | MAX FID ON CORE: 0.0 | _ |
| _ | 96-98 | 0.8 / 2 | SS-3 | N/A | 97.5-98.0: SAND W/ TRACE GRAVEL (SP), pale yellow, wet, loose, medium-grained sand, well sorted, gravel up to 1/4", | | _ |
| _ | | | | | round, chert | | _ |
| _ | | | | | 98.0-100.0: NO RECOVERY | MAX FID ON CORE: 0.0 | _ |
| _ | 98-100 | 0/2 | SS-4 | N/A | | 98.0-100.0: NO RECOVERY, DRILLER NOTED | _ |
| 100 | | | | | | V. HARD INTERVAL | _ |
| _ | | | | | 100.0-101.5: SL. SANDY CLAY (CL), v. dark grayish brown | MAX FID ON CORE: 0.0 | - |
| _ | 100-102 | 1.2 / 2 | SS-5 | N/A | to dark gray, moist, hard, ~5-10% fine-grained sand 101.5-102.0: SILTY SAND (SM), gray, wet, hard, well sorted, | | - |
| _ | | | | | v. fine-grained sand, ~20% silt | | _ |
| _ | | | | ĺ | 102.0-102.5: AS ABOVE | MAX FID ON CORE: 0.0 | - |
| - | 102-104 | 1.5 / 2 | SS-6 | N/A | 102.5-103.0: AS ABOVE, dark brown 103.0-104.0: CLAY (CL), gray, moist, hard, massive, no | | _ |
| | | | | ļ | mottling | | |
| 105 - | | | | ĺ | 104.0-106.0: AS ABOVE | MAX FID ON CORE: 0.0 | - |
| 100 — | 104-106 | 1.7 / 2 | SS-7 | N/A | | | _ |
| _ | | ļ | | | | | _ |
| - | | | | | 106.0-108.0: SILTY CLAY (CL), gray, moist, hard, massive, no mottling, ~20% silt | MAX FID ON CORE: 0.0 | _ |
| | 106-108 | 1.8 / 2 | SS-8 | N/A | no motting, ~20% Siit | | _ |
| | | | | | | | _ |
| _ | | | _ | | 108.0-110.0: AS ABOVE | MAX FID ON CORE: 0.0 | - |
| _ | 108-110 | 1.8 / 2 | SS-9 | N/A | | | |
| 110 | | | | | 0.0-110.0: 12" CARBON STEEL PERMANENT CASING | 4 | |
| _ | | | | ĺ | 110.0-118.0: NO RECOVERY | MAX FID ON CORE: N/A | -[|
| _ | | | | ĺ | | 110.0-118.0: NO RECOVERY, DRILLER | - |
| _ | | | | | | NOTED HEAVING. 18-IN RUBBER PLUG | |
| _ | 110-118 | 0/8 | C-1 | N/A | | FROM MUD ROTARY CASING INSTALLATION MAY HAVE PLUGGED THE CORE BARREL. | - |
| _ | | | | | | IVAT HAVE FLOGGED THE CONE DANKEL. | _ |
| _ | | | | ĺ | | | |
| 115 - | | | | ĺ | | | - |
| | | 1 | | | | • | |

SHEET 2 of 3

MW-232 (IW-5) SH



SOIL BORING LOG

| | | | Intermed | iate Aquifer Inv. | LOCATION: Memphis, Tennessee | ELEVATION: |
|-------|------------|---------|----------|-------------------|---|---|
| | CONTRA | | | Boart Longyear | | NAME OF DRILLER: T. Schmalfeldt / C. Herron |
| | METHOD | | | | Mud Rotary (M) / SR 120 Track-Mounted Rotasonic (R) | SIZE/TYPE OF BIT : 17.25" (M) / 4X6"; 9.25" (R) |
| | RDEN THI | | | | D INTO ROCK N/A | TOTAL DEPTH OF BORING 176 ft-bgs |
| | EVELS : | | gs | • | (M); 9/16/07 (R) / END: 9/13/07 (M); 9/17/07 (R) | LOGGER: Derek Miller/ORO |
| - | LOW SURF | | | STANDARD | SOIL DESCRIPTION | COMMENTS |
| 1 | SAMPLE INT | | , | PENETRATION | | |
| | | RECOVE | | TEST | SOIL NAME, USCS GROUP SYMBOL, COLOR, | DEPTH OF CASING, DRILLING RATE, |
| | | | #/TYPE | RESULTS | MOISTURE CONTENT, RELATIVE DENSITY, | DRILLING FLUID LOSS, |
| | | | | 6"-6"-6" | OR CONSISTENCY, SOIL STRUCTURE, | TESTS, AND INSTRUMENTATION. |
| | | | | (N) | MINERALOGY. | FID (ppm) |
| _ | | | | | | MAX FID ON CORE: N/A _ |
| _ | 110 110 | 0/8 | 0.1 | NI/A | | _ |
| _ | 110-118 | 0/8 | C-1 | N/A | | |
| - | | | | | | - |
| - | | | | | 118.0-119.0: GROUT GRAVEL/SAND/FLOUR MIX, gray, (wet) | MAX FID ON CORE: 13.9 |
| _ | | | | | loose, v. hard and breakable w/ hammer, gravels up to 1", | |
| 100 - | | | | | subangular | _ |
| 120 | | | | | 119.0-119.5: RUBBER SEAL, from mud rotary grout installation 119.5-126.0: SL. SILTY CLAY(CL), dark gray, sl. moist, hard, | _ |
| _ | | | | | ~5-10% silt | _ |
| _ | | | | | | |
| _ | 118-126 | 8/8 | C-2 | N/A | | _ |
| - | | | | ĺ | | _ |
| _ | | | | | | |
| _ | | | | | | _ |
| 125 - | | | | | | - |
| 120 — | | | | | | |
| _ | | | | | | |
| _ | | | | | 126.0-128.2: SILTY CLAY (CL), dark gray, sl. moist, firm to | MAX FID ON CORE: 56.8 |
| _ | | | | | soft, low plasticity, ~40% silt | Sample <i>MW232 SS 127</i> : |
| _ | | | | | | VOC (8260B/5035A) |
| _ | | | | | 128.2-128.8: SILTY SAND (SM), gray, moist, v. soft and | TOC (415.1) |
| _ | | | | | crumbly, v. fine-grained sand, ~10% silt | - |
| 130 - | | | | | 128.8-136.0: SILTY CLAY (CL), brownish dark gray, sl. moist, hard, low plasticity, ~40% silt | - |
| _ | | | | | india, ion placticity, ions ont | |
| _ | 126-136 | 10 / 10 | C-3 | N/A | | _ |
| _ | | | | | | - |
| _ | | | | | | |
| _ | | | | | | _ |
| _ | | | | | | - |
| _ | | | | | | _ |
| 135 | | | | | | |
| _ | | | | | | _ |
| - | | 1 | | | 136.0-146.0: SL. SILTY CLAY (CL), dark gray, sl. moist, firm, | MAX FID ON CORE: 14.7 |
| - | | | | | ~5-10% silt throughout | Sample <i>MW232_ST_136-138:</i> (Shelby tube) |
| | | | | Ī | | Vertical permeability and grain size analysis |
| _ | | | | | | - |
| - | | | | Ī | | _ |
| | | | | | | |
| 140 | | | | Ī | | _ |
| _ | | | | | | _ |
| _ | 136-146 | 10 / 10 | C-4 | N/A | | |
| | | | | | | |
| _ | | | | Ī | | _ |
| - | | | | | | _ |
| _ | | | | Ī | | |
| | | | | | | _ |
| 145 | | | | Ī | | _ |
| _ | | | | Ī | | - |
| - | | | | | 146.0-150.1: AS ABOVE | MAX FID ON CORE: 12.2 |
| | | | | Ī | · · · · · · · · · · · · · · · · · · · | _ |
| _ | | | | | | _ |
| _ | 146-156 | 10 / 10 | C-5 | N/A | | - |
| - | | | | | | _ |
| 455 | | | | ĺ | | |
| 150 | | | | | | |



PROJECT NUMBER 334469.SA.HS **BORING NUMBER**

MW-232 (IW-5)

SHEET 3 of 3

SOIL BORING LOG

| PROJECT : Memphis Depot - Intermediate Aquifer Inv. LOCATION : Memphis, Tennessee ELEVATION: | | | | | | | |
|--|------------|----------|---------|---|---|--|--|
| DRILLING CONTRACTOR: Boart Longyear NAME OF DRILLER: T. Schmalfeldt / C. Herron | | | | | | | |
| DRILLIN | G METHOD/ | EQUIPMI | ENT: | Canterra CT 250 Mud Rotary (M) / SR 120 Track-Mounted Rotasonic (R) | | SIZE/TYPE OF BIT: 17.25" (M) / 4X6"; 9.25" (R) | |
| | JRDEN THIC | | | | D INTO ROCK N/A | TOTAL DEPTH OF BORING 176 ft-bgs | |
| | LEVELS: | | gs | START: 8/17/07 | (M); 9/16/07 (R) / END: 9/13/07 (M); 9/17/07 (R) | LOGGER: Derek Miller/ORO | |
| DEPTH BELOW SURFACE (FT) STAN | | | | | SOIL DESCRIPTION | COMMENTS | |
| | SAMPLE INT | ERVAL (F | Γ) | PENETRATION | | | |
| | | RECOVER | RY (FT) | TEST | SOIL NAME, USCS GROUP SYMBOL, COLOR, | DEPTH OF CASING, DRILLING RATE, | |
| | | | #/TYPE | RESULTS | MOISTURE CONTENT, RELATIVE DENSITY, | DRILLING FLUID LOSS, | |
| | | | | 6"-6"-6" | OR CONSISTENCY, SOIL STRUCTURE, | TESTS, AND INSTRUMENTATION. | |
| | | | | (N) | MINERALOGY. | FID (ppm) | |
| | 146-156 | 10 / 10 | C-5 | N/A | 150.1-151.0: SANDY CLAY (CL), dark gray, sl. moist, firm, ~20-25% v. fine-grained sand 151.0-151.1: SANDSTONE GRAVEL (GP), v. dark gray, sl. moist, v. hard, breaks w/ considerable finger pressure 151.1-153.7: SILTY SAND (SM), light gray, wet, v. soft, v. fine grained sand, ~15% silt, clear contact 153.7-155.5: AS ABOVE, brownish yellow 155.5-156.0: AS ABOVE, pale brown | MAX FID ON CORE: 12.2 | |
| 160 | 156-166 | 10 / 10 | C-6 | N/A | 163.0-163.3: CLAY (CL), light grayish yellow, moist, v. soft, high plasticity, few medium distinct reddish brown mottles 163.3-166.0: SILTY SAND (SM), pale brown, wet, v. soft, v. fine-grained sand, ~15% silt, clear contact | MAX FID ON CORE: 0.0 | |
| 170 | 166-176 | 10 / 10 | C-7 | N/A | 166.0-176.0: AS ABOVE | MAX FID ON CORE: 5.2 | |