REVISIONS BORING NO. B-01 BORING NO. B-02 STATION 399+49, 91' LT. OF € SURVEY STATION 400+21, 130' LT. OF € SURVEY (JANUARY 20, 2010) (JANUARY 21, 2010) **LEGEND** V. = VERY FL. = FAIRLY DCD = DIAMOND CORE DRILLING, ASTM D2113-83 530 SPT = STANDARD PENETRATION TEST, ASTM D1586 = SLIGHTLY = LIGHT SS = SPLIT SPOON SAMPLER MED. = MEDIUM N = NUMBER OF BLOWS PER 12 INCHES BRN. = BROWN TR. = TRACE MC = MOISTURE CONTENT = DARK LL = LIQUID LIMIT (NV=NO VALUE) SURFACE ELEVATION - 522.6 522.6 — #200 = 43.0 BLK. = BLACK SURFACE ELEVATION - 522.0 — 522.0 — #200 = 62.3 PI = PLASTICITY INDEX (NP=NO PLASTICITY) 521.1 — SPT: N = 5, #200 = 55.5 SANDY CLAY, CL; DK. BRN. (7.5YR 3/6) 520.5 — SPT: N = 10, #200 = 61.2 520 520 SILTY SAND, SM: BRN, (7.5YR 3/6) #200 = PERCENT PASSING #200 SIEVE 519.6 ¬_ #200 = 45.6 MOIST, MED. PLASTICITY, STIFF V. MOIST, NONPLASTIC, LOOSE **—** #200 = 69.5 UCS = UNCONFINED COMPRESSIVE STRENGTH LL=34, PL=19 517.6 — SPT: N = 7, #200 = 60.0 SANDY CLAY, CL: BRN 517.6 BRN. (7.5YR 4/7) TCP = TEXAS CONE PENETROMETER 517.0 — SPT: N = 7, #200 = 75.9 (7.5YR 4/8) MOIST, LOW PLASTICITY, CI:11 =39 PI =23 WCL = WET CAVE IN FIRM LL=26, PL=11 FL. HIGH PLASTICITY 515.0 514.6 — #200 = 67.3 CL; LL=38, PL=24 514.5 CLAYEY SAND, SC; BRN. (7.5YR 4/8) 514.0 — #200 = 51.7 V. MOIST, FL. LOW PLASTICITY, CLAY WITH SAND, BRN, (7.5YR 4/7) 512.6 — SPT: N = 9, #200 = 68.0 ▼ = WATER LEVEL AFTER DRILLING LOOSE, LL=28, PL=15 512.0 — SPT: N = 6, #200 = 58.4 V. MOIST, MED. PLASTICITY, FIRM SANDY CLAY, CL; BRN. (7.5YR 4/8) MED. PLASTICITY, FIRM USCS: CL; LL=36, PL=23 510 ▼ = WATER LEVEL 24 HOURS AFTER DRILLING SANDY CLAY, CL; BRN. (7.5YR 5/8) & LL=34, PL=18 = TOP OF ROCK 507.6 — SPT: N = 9, #200 = 55.8 MED. LT GRAY (N6) BRN. (7.5YR 5/8), STIFF 507.0 507.0 V. MOIST, FL. HIGH PLASTICITY, FIRM USCS: CL; LL = 37, PI = 24 LL=32, PI=18 BRN (7.5YR 4/6) FL LOW PLASTICITY MED. PLASTICITY NOTE: "SS" DENOTES STANDARD PENETRATION TEST, AASHTO D1586-84. "TCP" LL=27, PL=14 LL=30. PL=18 DENOTES TEXAS CONE PENETRATION TEST 502.6 — SPT: N = 9, #200 = 30.3 CLAYEY SAND, SC; BRN. (7.5YR 5/8) & NOTE: WATER LEVEL ELEVATION SHOWN WERE OBTAINED AT THE SILTY CLAYEY SAND, SC-SM; LT. BRN (7.5YR 6/8) TR. PLASTICITY, LOOSE MED. GRAY (N5) WET, MED. PLASTICITY, MED. DENSE 500 500 TIME THE BORINGS WERE DRILLED AND MAY FLUCTUATE THROUGHOUT THE YEAR. LL=33, PL=20 NOTE: ROCK CLASSIFICATION IS BASED ON DRILLING CHARACTERISTICS 497.6 — SPT: N = 7, #200 = 41.1 SILTY SAND, SM: LT, BRN, (7.5YR 6/8) HIGHLY WEATHERED SHALE AND VISUAL OBSERVATION OF ROCK CORE SAMPLES. PETROGRAPHIC ANALYSIS OF THIN SECTIONS OF THE ROCK CORE SAMPLES MAY REVEAL OTHER TYPES. MED. DK. GRAY (N4) MOIST, SO TR. PLASTICITY, LOOSE, LL=20, PL=2 SITE GEOLOGY 492.6 492.6 — SPT: N = 12, #200 = 96.9 SHALEY CLAY, CL; MED. GRAY (N5) THE "ENGINEERING CLASSIFICATION OF GEOLOGIC MATERIALS, DIVISION ONE, 490 V. MOIST, FL. LOW PLASTICITY, STIFF "RESEARCH AND DEVELOPMENT DIVISION OF OKLAHOMA HIGHWAY DEPARTMENT, 1970, INDICATES THAT THE PROJECT SITE IS LOCATED OVER THE MCALESTER UNIT (IPMA). SPT: 25/6", 45/6", 50/3" 11 = 27 PI = 14 THIS GEOLOGIC FORMATION IS DESCRIBED THEREIN AS FOLLOWS: 487.6 — SPT: N = 61 487.0 = TOP OF ROCK MCALESTER UNIT (IPMA): THIS UNIT CONSISTS OF PREDOMINATELY SHALE, A FEW SHALE W/ INTERBEDDED SANDST HIGHLY WEATHERED SHALE, WIDELY SPACED BEDS OF SANDSTONE, AND POSSIBLY A FEW VERY THIN LIMESTONE BEDS. THE SHALE IS GENERALLY DARK COLORED, MOSTLY SILTY, ED. DK. GRAY (N4) MED. DK. GRAY (N4), SOFT — TCP = $50/2 - \frac{1}{2}$ ", $50/1 - \frac{1}{2}$ " LOCALLY CLAYEY, AND OCCURS IN THICK INTERVALS. THE SANDSTONE IS MODERATELY HARD TO HARD, BROWN TO GRAY, IN BEDS A FEW INCHES THICK TO 482.6 — SPT: N = 16/6", 43 10 FEET THICK, AND IN SEQUENCES UP TO 30 FEET THICK. THE LIMESTONES ARE 480 480 INSIGNIFICANT IN THIS UNIT. 477.6 — SPT: 25/6", 50/6" THE THICKNESS OF THE MCALESTER UNIT IS 200 TO 400 FEET IN MUSKOGEE COUNTY, 275 TO 600 FEET IN MCINTOSH COUNTY, 500 TO 700 FEET IN SEQUOYAH, 477.1 = TOP OF 476.6 476.5 — TCP = 50/3", 50/2-1/4" 700 TO 2,000 FEET IN HASKELL COUNTY, AND 1,500 TO 2,800 FEET IN PITTSBURG SHALE W/ INTERBEDDED SANDSTONE. COUNTY THE UNIT THINS RAPIDLY NORTHWARD IN WAGONER COUNTY FROM MED. DK. GRAY (N4), SOFT ABOUT 200 FEET AT THE SOUTH END TO LESS THAN 50 FEET AT ITS NORTHERN 476.2 — TCP = $50/4-\frac{1}{2}$ ", 50/4" BOUNDARY, THE MCALESTER UNIT DOES NOT OUTCROP IN THE REMAINING COUNTIES OF DIVISION ONE. 471.5 — TCP = $50/3-\frac{1}{4}$ ", $50/2-\frac{3}{4}$ " 471.2 — TCP = 50/3-1/5", 50/3-3/4" 470 THE TOPOGRAPHY OF THIS UNIT IS CHARACTERIZED BY BROAD FLAT SHALE AREAS INTERRUPTED BY OCCASIONAL FAIRLY PROMINENT RIDGES CAPPED BY THE WIDELY SPACED SANDSTONE BEDS OR SEQUENCES OF BEDS. 466.5 — TCP = 50/2", 50/1-3/4" ACCORDING TO THE GEOLOGIC MAP OF THE "HYDROLOGIC ATLAS 1" OF OKLAHOMA 466.2 — TCP = $50/5-\frac{1}{4}$ ", $50/5-\frac{1}{2}$ " "RECONNAISSANCE OF THE WATER RESOURCES OF THE FORT SMITH QUADRANGLE, EAST-CENTRAL OKLAHOMA," BY MELVIN V. MARCHER, U.S. GEOLOGICAL SURVEY, SECOND PRINT 1988, INDICATES THAT THE PROJECT SITE IS LOCATED OVER THE MCALESTER AND HARTSHORNE FORMATIONS (IPMH). THIS GEOLOGIC FORMATION IS 461.5 — TCP = 50/3-1/4", 50/2-1/8" 461.2 — TCP = 50/5", 50/5-1/4" DESCRIBED THEREIN AS FOLLOWS: 460 MCALESTER AND HARTSHORNE FORMATIONS (QT): SHALE, SANDSTONE, AND COAL. YIELD LIMITED AMOUNTS OF WATER OF POOR QUALITY. ___ 456.5 — TCP = 50/2-1/2", 50/1-5/8" 456.2 — TCP = 50/2-1/4", 50/3" BOTTOM OF BORING - 456.0 GEOTECHNICAL REPORT ALL GEOTECHNICAL INFORMATION CONTAINED ON THIS SHEET IS COVERED BY THE SANDSTONE, MED. DK. GRAY (N4) 452.6 ENGINEERING SEAL AFFIXED TO AN ORIGINAL GEOTECHNICAL ENGINEERING REPORT THAT HAS BEEN STAMPED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN OKLAHOMA. TO OBTAIN A COPY OF THE COMPLETE REPORT, CONTACT THE ODOT 451.2 — TCP = $50/1-\frac{1}{2}$ ", $50/1-\frac{1}{4}$ " 450 OFFICE ENGINEER AT (405) 521-2625. THE CONTRACTOR SHOULD BE FULLY AWARE OF THE SITE CONDITIONS PRIOR TO BEGINNING WORK ANY ADDITIONAL GEOTECNICAL INFORMATION WHICH MAY BE DESIRED IS THE RESPONSIBILITY OF THE CONTRACTOR. 446.2 — TCP = 50/2", 50/1-3/4" BOTTOM OF BORING - 445.6 -XXXXX COUNTY BRIDGE "A" XX X/XX SH-XX OVER XXXX CREEK XX X/XX 440 (PLACE COMPANY NAME FOUNDATION BORING LOGS XX X/XX OR LOGO HERE) (SHEET 1 OF 2) Smund XXXXXX nor: XXXXXX

STATE OF DEPARTMENT OF TRANSPORTATION OKLAHOMA JOBPIECENO. XXXXX(XX) STEETINO. BOOO