

STANDARD BID CONDITIONS

H-16-335H

1. **ACCEPTANCE AND REJECTION:** The Arkansas State Highway and Transportation Department (AHTD) reserves the right to reject any or all bids, to accept bids in whole or in part (unless otherwise indicated by bidder), to waive any informalities in bids received, to accept bids on materials or equipment with variations from specifications where efficiency of operation will not be impaired, and to award bids to best serve the interest of the State.
2. **PRICES:** Unless otherwise stated in the Bid Invitation, the following will apply: (1) unit prices shall be bid, (2) prices should be stated in units of quantity specified (feet, each, lbs., etc.), (3) prices must be F.O.B. destination specified in bid, (4) prices must be firm and not subject to escalation, (5) bid must be firm for acceptance for 30 days from bid opening date. In case of errors in extension, unit prices shall govern. Discounts from bid price will not be considered in making awards.
3. **BID BONDS AND PERFORMANCE BONDS:** If required, a **Bid Bond** in the form of a cashier's check, certified check, or surety bond issued by a surety company, in an amount stated in the Bid Invitation, must accompany bid. **Personal and company checks are not acceptable as Bid Bonds.** Failure to submit a Bid Bond as required will cause a bid to be rejected. The Bid Bond will be forfeited as liquidated damages if the successful bidder fails to provide a required Performance Bond within the period stipulated by AHTD or fails to honor their bid. When a bidder claims and can show clear and convincing evidence that a material mistake was made in the bid and was not the bid intended, the bidder may be permitted to withdraw their bid prior to award without forfeiture of bid bond. Cashier's checks and certified checks submitted as Bid Bonds will be returned to unsuccessful bidders; surety bonds will be retained. The successful bidder will be required to furnish a **Performance Bond** in an amount stated in the Bid Invitation and in the form of a cashier's check, certified check, or surety bond issued by a surety company, unless otherwise stated in the Bid Invitation, as a guarantee of delivery of goods/services in accordance with the specifications and within the time established in the bid. **Personal and company checks are not acceptable as Performance Bonds.** In some cases, a cashier's check or certified check submitted as a Bid Bond will be held as the Performance Bond of the successful bidder. Cashier's checks or certified checks submitted as Performance Bonds will be refunded shortly after payment has been made to the successful bidder for completion of all terms of the bid; surety bonds will be retained. Surety bonds must be issued by a surety company authorized to do business in Arkansas, and must be signed by a Resident Local Agent licensed by the Arkansas State Insurance Commissioner to represent that surety company. Resident Agent's Power-of-Attorney must accompany the surety bond. Certain bids involving labor will require Performance Bonds in the form of surety bonds only (no checks of any kind allowed). These bonds shall not only serve to guarantee the completion of the work, but also to guarantee the excellence of both workmanship and material until the work is finally accepted and the provisions of the Plans, Specifications, and Special Provisions fulfilled. In such cases, the company issuing the surety bond must comply with all stipulations herein and must be named in the U. S. Treasury listing of companies holding Certificates of Authority as acceptable sureties on Federal Bonds and as acceptable reinsuring companies. Any excess between the face amount of the bond and the underwriting limitation of the bonding company shall be protected by reinsurance provided by an acceptable reinsuring company. Annual Bid and Performance Bonds on file with E & P Division must have sufficient unencumbered funds to meet current bonding requirements, or the bid will be rejected, unless the balance is submitted as set forth above, prior to bid opening.
4. **TAXES:** The AHTD is not exempt from Arkansas State Sales and Use Taxes, or local option city/county sales taxes, when applicable, and bidders are responsible to the State Revenue Department for such taxes. These taxes should not be included in bid prices, but where required by law, will be paid by the AHTD as an addition thereto, and should be added to the billing to the AHTD. The AHTD is exempt from Federal Excise Taxes on all commodities except motor fuels; and excise taxes should not be included in bid prices except for motor fuels. Where applicable, tax exemption certificates will be furnished by the AHTD.
5. **"ALL OR NONE" BIDS:** Bidders who wish to bid "All or None" on two or more items shall so stipulate on the face of bid sheet; otherwise, bid may be awarded on an individual item basis.
6. **SPECIFICATIONS:** Complete specifications should be attached for any substitution or alternate offered, or where amplification is necessary. Bidder's name must be placed on all attachments to the bid.
7. **EXCEPTIONS TO SPECIFICATIONS:** Any exceptions to the bid specifications must be stated in the bid. Any exceptions to manufacturer's published literature must be stated in the bid, or it will be assumed that bidder is bidding exactly as stated in the literature.
8. **BRAND NAME REFERENCES:** All brand name references in bid specifications refer to that commodity or its equivalent, unless otherwise stated in Bid Invitation. Bidder should state brand or trade name of item being bid, if such name exists.
9. **FREIGHT:** All freight charges should be included in bid price. Any change in common carrier rates authorized by the Interstate Commerce Commission will be adjusted if such change occurs after the bid opening date. Receipted common carrier bills that reflect ICC authorized rate changes must be furnished.
10. **SAMPLES, LITERATURE, DEMONSTRATIONS:** Samples and technical literature must be provided free of any charge within 14 days of AHTD request, and free demonstrations within 30 days, unless AHTD extends time. Failure to provide as requested within this period may cause bid to be rejected. Samples, literature and demonstrations must be substantially the same as the item(s) being bid, unless otherwise agreed to by AHTD. Samples that are not destroyed will be returned upon request at bidders expense. Samples from successful bidders may be retained for comparison with items actually furnished.
11. **GUARANTY:** Unless otherwise indicated in Bid Invitation, it is understood and agreed that any item offered or shipped on this bid shall be newly manufactured, latest model and design, and in first class condition; and that all containers shall be new, suitable for storage or shipment and in compliance with all applicable laws relating to construction, packaging, labeling and registration.
12. **BACKORDERS OR DELAY IN DELIVERY:** Backorders or failure to deliver within the time required may constitute default. Vendor must give written notice to the AHTD, as soon as possible, of the reason for any delay and the expected delivery date. The AHTD has the right to extend delivery if reasons appear valid. If reason or delivery date is not acceptable, vendor is in default.
13. **DEFAULT:** All commodities furnished will be subject to inspection and acceptance by AHTD after delivery. Default in promised delivery or failure to meet specifications authorizes the AHTD to cancel award or any portion of same, to reasonably purchase commodities or services elsewhere and to charge full increase, if any, in cost and handling to defaulting vendor. Applicable bonds may be forfeited.
14. **ETHICS:** *"It shall be a breach of ethical standards for a person to be retained, or to retain a person, to solicit or secure a State contract upon an agreement of understanding for a commission, percentage, brokerage, or contingent fee, except for retention of bona fide employees or bona fide established commercial selling agencies maintained by the contractor for the purpose of securing business."* (Arkansas Code, Annotated, Section 19-11-708).

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

NOTICE OF NONDISCRIMINATION

The Arkansas State Highway and Transportation Department (Department) complies with all civil rights provisions of federal statutes and related authorities that prohibit discrimination in programs and activities receiving federal financial assistance. Therefore, the Department does not discriminate on the basis of race, sex, color, age, national origin, religion (not applicable as a protected group under the Federal Motor Carrier Safety Administration Title VI Program), disability, Limited English Proficiency (LEP), or low-income status in the admission, access to and treatment in the Department's programs and activities, as well as the Department's hiring or employment practices. Complaints of alleged discrimination and inquiries regarding the Department's nondiscrimination policies may be directed to Joanna P. McFadden Section Head – EEO/DBE (ADA/504/Title VI Coordinator), P. O. Box 2261, Little Rock, AR 72203, (501)569-2298, (Voice/TTY 711), or the following email address: joanna.mcfadden@ahtd.ar.gov

Free language assistance for Limited English Proficient individuals is available upon request.

This notice is available from the ADA/504/Title VI Coordinator in large print, on audiotape and in Braille.

**ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT
LITTLE ROCK, ARKANSAS
EQUIPMENT AND PROCUREMENT DIVISION
BID SHEET**

Contract No.: H-16-335H

BIDDER: _____

1. **1** – Track Mounted Rotary Wash and Auger Drill, Diesel Engine
to meet AHTD Spec. **16-218.**

FOB: **AHTD – Equipment and Procurement, 11302 West Baseline Road, Little Rock, AR 72209**

Bid Price (Do not include any Local, State or Federal Taxes) Each \$ _____

Total for **1** Track Mounted Rotary Wash and Auger Drill, Diesel Engine

Track Mounted Rotary Wash and Auger Drill, Diesel Engine **proposed as meeting specifications:**

Make _____ Model _____ Warranty _____

Guaranteed Delivery Date _____

Additional Units may be purchased at the same pricing and
conditions through _____
(Date)

BID TOTAL \$ _____

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

SPECIFICATION 16-218

FOR

BORING AND SUBSURFACE EXPLORATION
ALL-TERRAIN TRACK MOUNTED DRILL MACHINE

General Specifications:

1. **Current Model:** Units furnished under this specification shall be the latest improved model in current production, as offered to commercial trade, built for the U.S. market, and shall be of quality workmanship and material. Machines manufactured for foreign markets will not be accepted. All equipment offered under this specification shall be new. Used, reconditioned, shopworn, demonstrator, prototype or discontinued models are not acceptable. Manufacturers of the units supplied must have been in the business of producing operational units for at least two years and must have recently sold similar units to domestic governmental agencies. The model furnished must have been in production for a minimum of two year, or be the latest version of a previous model. Bidder/s may be required to submit documentation substantiating the aforementioned requirements. A list of user references may also be required.
2. **Literature:** **Manufacturers literature, verifying adherence of proposed unit to each line item addressed in this specification, shall be submitted with the bid. If any literature and/or specifications of items conflict with AHTD specifications, the conflict(s) shall be specifically noted, corrected and submitted with the bid.**
3. Any deviations from specifications and requirements herein must be clearly pointed out by bidder. Otherwise it will be considered that equipment offered is in strict compliance with these specifications and requirements, and successful bidder will be held responsible therefor. Deviations must be explained in detail on an attached sheet. However, no implication is made by the Arkansas State Highway and Transportation Department that deviations will be acceptable.
4. **Manuals:** The successful bidder shall furnish one (1) Operator's Instruction Manual with each unit delivered and one (1) copy each of Shop Repair Manual and Parts Book to each FOB point.

The successful bidder may provide Shop Repair Manuals and Parts Manuals on computer media (CD, DVD, USB Drive, etc.) in lieu of printed manuals.
5. **Training:** The successful bidder will be required to provide a minimum of four (4) days of training to familiarize AHTD operators and service technicians on operation and maintenance of units purchased under this specification.

In addition, the successful bidder shall furnish information on any factory service schools which would be available for AHTD service technicians.
6. Unit shall be assembled, adjusted and made ready for continuous operation at time of delivery.
7. All equipment necessary for efficient operation of unit shall be furnished whether or not they are specifically mentioned in this specification. All standard equipment as regularly furnished by manufacturer and as shown on printed literature and specification sheets shall be furnished unless specifically excluded by this specification.
8. The component parts of the unit shall be of proper size and design to safely withstand maximum stresses imposed by a capacity load, and the manufacturer's rated loads for chains and bearings shall not be exceeded when the unit is loaded with such loads.
9. The torque capacity of each driven part shall be equal to or exceed the torque capacity of its driving member.
10. All pressure systems shall be provided with suitable pressure relief valves. With the exception of the spindle and drilling tools, all moving parts which are so located as to be a hazard to operating or maintenance personnel shall be fully enclosed or properly guarded. Protective devices shall not impair the operating functions.

11. Parts Inventory & Service Facilities: The successful bidder shall maintain a representative inventory of replacement parts and service facilities for servicing equipment bid on.
12. Demonstration: The Arkansas State Highway & Transportation Department reserves the right to require a demonstration, under actual working conditions, of equipment bid under this specification before award is made. The demonstration would be performed (free of any charge) by the bidder or an authorized representative at a mutually acceptable location. If requested, the bidder should be prepared to demonstrate the equipment within thirty (30) days after notification. Failure of the bidder to perform a satisfactory demonstration within the specified time may be grounds for rejection of the bid.
13. Cooperative Purchasing: Other tax-supported entities* in Arkansas (cities, counties, state agencies, school districts, etc.) may purchase from this Contract on an individual basis under the same specifications and conditions, and at the pricing set forth by each vendor, all at the discretion of each vendor in each case. Prices could be reduced by a vendor for minor alterations in conditions (changing order quantities, deleting options, etc.) as agreed by both parties, but could not be raised above the contract bid price except for any additional freight charges. Vendors would not be required to sell to any such entity under this contract, and those entities would not be obligated to purchase from the contract.

Each entity wishing to purchase from the contract must make contact directly with the appropriate vendor(s). The Highway Department shall remain "out of the loop" for such transactions: all contact, orders, invoices, payments, etc. regarding such transactions must take place exclusively between the tax-supported entity and the vendor. The Department shall be held harmless of any and all liability arising from such transactions.

* Tax-supported entities are defined as those receiving more than half of total funding from appropriated tax funds.

Unit Specifications:

1. This equipment will be used for making foundation borings and performing in-field tests which will include performing standard penetration tests, obtaining undisturbed three inch OD Shelby tube samples and rock coring. The assembly of the rig, with its complement of auxiliary equipment, shall be so arranged that work may be carried on with maximum efficiency and a minimum of manual labor. The assembly shall make up a complete drilling unit and drilling tools specified shall be included. The drill machine shall be capable of performing auger borings to depths of 300' in unconsolidated formations with conventional flight or hollow-stem augers. The drill shall have the capability of being used productively for soil sampling and foundation testing by methods and techniques currently in popular use, including Shelby tube or continuous tube sampling and standard penetration testing. The drill shall be capable of handling "NW" size drill rods in a coring or rotary drilling application to over 1,600'. The unit shall be self-contained with all-terrain capabilities allowing access to difficult off-road sites.
2. **General**: The unit shall consist of a radio controlled track mounted vehicle with reinforced tracks, single engine power source, hydraulically-actuated folding upright drill frame with two (2) double acting hydraulic feed cylinders, hydraulically driven drill head, hydraulic system, hydraulic sliding base, mud pump assembly, mast, draw works,, two (2) heavy duty rear mounted and two (2) heavy duty front mounted hydraulic leveling jacks with rear mounted controls and hydraulic chuck assembly, body works and front carrier winch.
3. **Carrier**: Shall be track mounted all-terrain type with a rugged structural frame to resist twisting during rough usage. The carrier shall meet the following requirements:
 - A. **Undercarriage**: The undercarriage frame shall be constructed of high strength steel that meet or exceed ASTM A-500 Grade B. The section modulus of the frame shall be a minimum of 20.04.
 - B. **Rollers**: Rollers and idlers shall be sealed and lubricated type. Track tension adjustment shall be hydraulic type. The undercarriage shall have a minimum of six (6) track rollers and a minimum of one (1) carrier rollers per side.

- C. Tracks: Shall consist of continuous rubber tracks made with high tensile steel cable and a built-in iron core. Track shoes shall have a minimum width of 29". Track length shall be no less than 108". Maximum ground bearing pressure shall be no greater than 6.0 psi.
- D. Hydraulic Leveling Jacks: Carrier shall have four (4) hydraulically powered leveling jacks, one mounted on each corner. Each jack shall be individually controlled from the control console at the left rear of the drill and shall be permanently mounted on the carrier. The jacks shall provide adequate leveling ability and shall be rigid enough to easily support the total weight of the machine plus the loads generated when retracting drilling tools. Check valves shall be furnished in the hydraulic lines to prevent leakage or slippage of the jacks while the carrier is set up on a drill site. The jack foot pads shall have a minimum diameter of 10". When retracted, the jacks shall have at least 20" of ground clearance. The maximum cylinder travel shall be no less than 36". The minimum outside diameter of the jack cylinders shall be 4". Cylinder rams shall be no less than 2-1/2" diameter with chrome plating and completely enclosed to safeguard them from damage.
- E. Ground Clearance: Frame mounted components shall have a minimum of 13" ground clearance when in travel configuration.
- F. Travel: Unit shall include hydraulic pump(s) of sufficient size and capacity to perform all required functions of the machine, including travel. The pump controls shall be designed so that loss of a control signal immediately and automatically returns the drive unit to the neutral position. The machine shall be driven by two hydraulic motors, one on each track assembly. Hydraulic motors shall be affixed to heavy duty planetary final drives with internal braking capability. Shall have a minimum of two speeds and be designed to operate independent of each other for steering purposes. Steering shall have left, right and counter-rotating ability. Travel motors and hydraulic lines shall be enclosed within the width of the track frame. Hydraulic drive pump(s) may be used to supply other hydraulic system needs only if the control system is designed to ensure no movement of those systems can occur during travel and no track movement can occur during use of those functions.
- G. A belly pan shall be furnished to protect the underside of the carrier. The pan shall be secured by bolts and be removable for maintenance access.
- H. Grade: The machine shall be able to negotiate a 45° grade on a straight-ahead climb. The machine shall be able to negotiate a 24° grade on a side hill traverse.
- I. Backup Alarm: The carrier shall be equipped with an electric travel alarm meeting the requirements of SAE J994 with a minimum sound level output of 97 decibels.
- J. Recovery Winch: The carrier shall incorporate a hydraulic motor driven planetary recovery winch located centrally under the front bumper of the undercarriage. Bare drum winch capacity shall be greater than or equal to 20,000 lb. The winch shall include a roller fairlead and be fitted with a minimum of 100' of 9/16" dia. wire rope and an adequately sized safety hook. The winch drive shall include provisions to manually disconnect the planetary drive allowing for freewheel unspooling of wire rope.
- K. Transport: A minimum of six (6) anchor points of sufficient capacity to allow the machine to be properly secured to the deck of a trailer for transport shall be provided.

4. **Carrier Deck**:

- A. Deck Auger Rack: An open-top auger storage rack shall be located on the carrier deck on the left side of the machine immediately forward of the operator's control panel. The rack shall be designed to allow for easy auger removal and replacement using the draw works of the machine. Rack capacity shall be of sufficient size to hold a minimum of eight (8) heavy-duty hollow-stem augers, 5' x 4-1/4" O.D.

- B. Front Auger Rack: An additional open-top auger storage rack shall be located on the front of the undercarriage above the front bumper and recovery winch. Rack capacity shall be of sufficient size to hold a minimum of eight (8) heavy-duty hollow-stem augers, 5' x 4-1/4" O.D.
- C. Drill Rod Rack: A drill rod storage rack for 10' length drill rods shall be provided on the right side of the machine underneath the hydraulic reservoir and fuel tank. The rod storage area shall be of sufficient size to hold a minimum of 18 (NW) drill rods, 10' x 2-5/8" O.D. Drill rods will be stowed and removed from the rear of the machine. A hinged rod stop shall be furnished to secure the drill rods during transport.
- D. Tool Box: A double door steel storage tool box shall be provided on the left side of the carrier deck immediately aft of the front jack assembly. Toolbox dimensions shall be no less than 18" High x 18" Deep x 72" Long. Doors shall be hinged on the ends to swing parallel to the carrier deck and be equipped with lockable latches.
- E. Deck Plate: All exposed deck areas where standing may be possible shall be covered with a non-slip material. All components mounted above deck shall be affixed to structural members below the deck plate. Deck plate shall not be used as a structural support under any circumstance.

5. **Remote Control System:**

- A. Radio Remote Control: Unit shall be equipped with one (1) complete set of radio remote controls, including one (1) spare radio control transmitter.
- B. Travel Control: Track movement shall be controlled by a radio remote control system. The radio remote transmitter shall include proportional paddle-style controls for left track forward/reverse, right track forward/reverse. The transmitter shall include a proportional dial-type control which limits overall track speed as a percentage of maximum track speed. The transmitter shall include two proportional dial-type trim controls adjusting vehicle left/right tracking when both track paddles are moved fully in the same direction; one dial shall independently adjust trim in the forward direction and the other dial shall independently adjust trim in the reverse direction. The transmitter shall include maintained two-position toggle switches for transmitter ON/OFF as well as track speed HIGH/LOW.
- C. Emergency Stop: The transmitter shall include an emergency stop switch. The emergency stop switch shall be red in color, large in size, and conspicuously positioned on the transmitter as to be quickly located and easily accessible in the event of an emergency. The emergency stop switch operation shall be push to stop, twist to reset. When the remote control system is in use, activation of the emergency stop switch shall cause all controls to return to their neutral position as well as shut down the engine.
- D. Tether Connection: The radio remote transmitter shall include provisions for a wired backup connection to the remote receiver. A wired tether cable for this purpose shall be supplied of adequate length to allow an operator to stand clear of the machine during tram operations. The tether cable shall supply power to the receiver so that the tram controls can be operated even when transmitter batteries are depleted or not installed. Connecting the tether cable shall also serve to pair the transmitter and receiver, enabling continued wireless communication after the tether cable is disconnected.
- E. Throttle: The transmitter shall contain a throttle control switch.
- F. Winch Control: The radio remote control system shall have a proportional paddle-style control for recovery winch forward/reverse.
- G. Disable Function: It shall be possible to power off the remote control system independently of other rig systems to ensure that tram controls are disabled during drilling operations.

H. In the event of loss of communication between radio transmitter and receiver, the receiver shall be designed to immediately halt all machine movement until communication can be restored.

6. **Engine:**

- A. **Engine:** Liquid cooled; turbocharged 4 cycle diesel with no less than 6 cylinders and a minimum piston displacement of 5.7 liters. Shall have an advertised rating of no less than 170 SAE net horsepower at rated RPM. Shall have 12 volt electric system and include starter, battery and alternator. Shall have lube oil and fuel filters, approved type air cleaner, muffler, fuel tank of sufficient capacity to allow a minimum of eight (8) hours of continuous operation, fuel gauge and all other accessories or equipment necessary for efficient operation.
- B. **Cooling System:** As recommended and regularly furnished by the manufacturer for use with the engine size specified above with anti-freeze protection to -20° F, or lower.
- C. **Engine Shutdown:** Engine safety shutdown system with manual or automatic override to include the following features: Low oil pressure - warning bell/buzzer plus shutdown, high coolant temperature warning bell/buzzer plus shutdown and low coolant level warning bell/buzzer plus light or shutdown.
- D. One engine shall be utilized to provide power for all functions of the machine. The engine shall provide sufficient power to meet all performance standards listed within this specification.
- E. The engine shall be mounted to a hydraulically actuated tilting cradle, allowing for drill rig operation on slopes in excess of the diesel power unit's specified maximum tilt angle for continuous operation. The combined continuous operation angle for the engine on cradle shall be no less than 45 degrees from horizontal. This system should allow the rig to drill vertically on slopes up to 45 degrees with the tracks contacting the ground.
- F. The power unit shall be fitted with a suitable hydraulic pump drive assembly which shall interface directly with the diesel engine flywheel and bell housing. The pump drive shall incorporate a manually-operated clutch unit to allow for disengagement of the hydraulic system from the power unit.
- G. Engine controls and gauges shall be located at the operator's control panel and shall include start/run/stop key switch with removable key, throttle control, engine tachometer, hour meter, alternator amperage, oil temperature, oil pressure, coolant temperature, fuel gauge and glow plug indicator.

7. **Fuel System:**

- A. **Fuel Tank:** Shall be constructed of steel and have internal baffles to stabilize liquid movement within the tank. Fuel tank shall have a minimum capacity of no less than 45 gallons and be fitted with a breather designed to prevent ingress of dust. The breather element shall be elevated to ensure that fuel does not overflow through the breather when the machine travels over uneven terrain and shall be protected from damage when transporting the machine through wooded areas.
- B. In addition to filtration components integral to the diesel engine, the unit shall incorporate a fuel pre-filter and water separator unit. Pre-filter element(s) shall have no more than a 35 micron rating. The pre-filter unit shall include a clear globe to visibly detect the presence of excess water and shall include provisions to attach a drain hose for removal of contaminants without spillage.

8. **Hydraulic System:**

- A. **Pumps:** Shall have heavy-duty engine driven hydraulic pump(s) which run independently of the gear train. The hydraulic pump(s) shall be driven so that hydraulic power will be available whenever the engine is running. Hydraulic pump shall be of size and capacity to perform all required operations. If hydraulic pump(s) provide asynchronous flow for both the drilling operation and carrier movement safeguards to ensure that the pump will cause neither inadvertent track movement during drilling operations nor

inadvertent drill spindle movement during tram operations must be taken. A fixed-displacement gear pump shall be provided to provide flow to the water pump circuit. A hydraulic pump shall provide flow to all remaining setup, drilling, and accessory functions. The system shall be equipped with full-flow replaceable hydraulic oil filter. A hydraulic oil cooler with fan shall be furnished.

- B. Reservoir: Shall be constructed of steel and have internal baffles to stabilize liquid movement within the reservoir. Hydraulic reservoir shall have a minimum capacity of no less than 95 gallons and have a removable cover to provide access to aid in cleanout. The reservoir shall include a drain port fitted with a lockable shutoff valve and include provisions for connection of an external drain hose.
- C. Gauge: A hydraulic oil temperature gauge shall be easily visible to the operator.
- D. Return Filter Assembly: Shall be a 10 micron replaceable cartridge element and a built in bypass and a bypass condition indicator. The bypass condition indicator shall be installed so its face can be seen by the operator. All return oil shall pass through a return filter.
- E. Breather: The hydraulic tank shall be fitted with a breather element designed to prevent ingress of dust. The breather element shall be elevated to ensure that hydraulic fluid does not overflow through the breather when the machine travels over uneven terrain and shall be protected from damage when transporting the machine through wooded areas.
- F. Shutoff Valves: All reservoir ports located below the fluid surface shall include lockable shutoff valves.
- G. Hydraulic Oil: The hydraulic oil provided shall be Biohydran AW 68 biodegradable or approved equivalent.

9. Hydraulic Cooling and Filtration:

- A. Variable displacement hydraulic pumps shall be equipped with full-flow suction filtration located in-line between the hydraulic reservoir and charge pump supply port. Filter elements shall be of synthetic material and no greater than 10 micron rating. Each suction filter shall include a vacuum gauge indicating the need for filter element replacement, which shall be easily visible to an operator. The suction filter shall include an integrated check valve to prevent siphoning. The suction filter shall include an integrated bypass designed to prevent pump cavitation due to clogged filter media.
- B. Hydraulic reservoir gear pump supply ports shall be equipped with internal screen-type strainers to protect against ingress of large particles. Screen size shall be no greater than 100 mesh (149 micron). The strainers shall include an integrated bypass designed to prevent pump cavitation due to clogged filter media.
- C. Return flow from control panel and water pump valve outlets shall be combined and routed through a hydraulic oil cooler followed by a full-flow return line filtration unit prior to returning to the hydraulic reservoir.
- D. The hydraulic oil cooler shall be oil-to-air type full flow heat exchanger equipped with a suction fan assembly. The oil cooler fan shall be driven by a hydraulic-motor. The cooling system shall be sized to provide adequate cooling capacity to prevent overheating during normal operation in ambient air temperatures up to no less than 125° Fahrenheit.
- E. The return filter shall be a full-flow return line filtration unit. Filter elements shall be of synthetic material and no greater than 10 micron rating. The return filter shall include a pressure gauge indicating the need for filter element replacement, which shall be easily visible to an operator. The return filter shall include an integrated bypass designed to prevent return line overpressure due to clogged filter media.

10. Automatic SPT Hammer:

- A. Hammer: The drill rig shall be outfitted with an automatic hammer designed for SPT sampling operations. The hammer shall impact an anvil designed for this purpose attached to the top of the drill rod string by repeatedly dropping a slug with a mass of 140 lb. with a minimum free fall distance of 30". The fall height

shall be controllable within a tolerance of plus or minus ½". A method for visual verification of the fall height of the weight while the hammer is in operation shall be provided. The hammer shall operate at a minimum rate of 40 blows per minute. The hammer shall incorporate a chain-driven lifting mechanism with provisions to adjust chain tension. A safety feature shall be furnished that will prevent the hammer from operating if the anvil is not in place. The automatic hammer shall meet the latest requirements of ASTM D-1586.

- B. Lift Cylinder: The automatic hammer assembly shall be affixed to a vertically oriented hydraulic lifting cylinder with a stroke of no less than 30 inches to assist in positioning the hammer to prepare for sampling. The lifting cylinder shall be capable of float operation so as to allow the hammer body to advance downward to match sampler advancement with each successive blow. The hammer shall incorporate a removable pin designed to prevent shifting of the hammer unit during transport.
- C. Mounting: The complete hammer and lifting cylinder assembly shall mount to the drill head carrier base plate. After operating the slide head function to move the drill head off the drill string, the automatic hammer shall swing into place over the hole.

11. Hydraulic Chuck:

- A. Shall have a heavy duty NWJ chucking rod a maximum of 41" in length with a water swivel on top and NWJ threaded Pin on bottom. Water Swivel shall have 2" NPT LHT lower connection Pin, with 2" RHT hose connection at the water inlet. Water swivel shall be designed to withstand the forces created by high speed drilling operations as described herein.
- B. The drill rig shall incorporate a hydraulically operated drill rod chucking device. The chuck shall be affixed above the drill spindle. Clamping force shall be generated by compressed springs and hydraulically released to ensure clamping force is maintained even after a loss of power. The chuck shall incorporate no less than 5 removable replaceable jaws with tungsten carbide gripping teeth, equally spaced radially around the drill rod. The chuck shall be designed to allow for routine jaw changes in the field with standard tools. The chuck shall attach to the drill spindle by way of a bolt-on adapter and shall be capable of transferring torque to the drill string in both the forward and reverse directions. Jaw kits shall be made available in various industry standard sizes up to 4-1/2" rod diameter and shall include a complete matched jaw set, a size-matched lifting bail to be inserted when the chuck is not in use, and any additional accessories or hardware necessary to facilitate a change in rod size. One jaw kit of size 2-5/8" (NW drill rod) shall be furnished with the machine at time of delivery.

- 12. Auger Guide: The drill rig shall include a removable auger guide useful for maintaining proper alignment when beginning a new auger hole. Auger guides shall be made available for a variety of industry standard auger sizes. One auger guide sized to accept 4-1/4" H.D. hollow-stem augers shall be included.

13. Safety Systems:

- A. Emergency Stop Switches: The drill rig shall be equipped with multiple emergency stop switches designed to rapidly and safely shut down the machine. Actuation of an emergency switch shall immediately trigger the rotation shutdown valve; return all controls to the neutral position and shut down the diesel engine. At a minimum, three emergency stop switches shall be furnished. One emergency stop switch shall be located at the operator's control panel a second emergency stop switch shall be furnished at the right rear corner of the machine and a third emergency stop switch shall be located on the remote control system transmitter. Emergency stop switches shall be maintained position, push to stop, twist to reset, red in color, large in size, and conspicuously positioned as to be quickly located and easily accessible in the event of an emergency.
- B. In-Line Valve: The drill head rotation hydraulic circuit shall be fitted with an electrical solenoid operated, in-line valve designed to rapidly halt drill head rotation by blocking motor side ports while simultaneously connecting pump side ports to prevent damage to the hydraulic system. For safety, the valve shall be

configured to stop rotation and bypass pump flow in the default de-energized state. Safeguards shall be installed to protect motor-side hydraulic hoses and components during rapid deceleration while ensuring that rotation stops in less than one revolution.

- C. Limit Switch: The drill rig shall be equipped with two (2) “wobble” type limit switches mounted to the lower portion of the mast on opposing sides of the drill string. Contact with either switch shall trigger the rotation shutdown valve; resulting in immediate stoppage of the drill string rotation within less than one rotation.

14. **Drill Head Feed Mechanism:**

- A. Drill Head Carrier: Carrier travel shall be no less than 13 feet and shall provide a minimum of 16,000 lbs. of pull down force and 20,000 lbs. of retract force. Shall mount to and travel along two steel guide rails rigidly affixed to the mast frame. All sliding surfaces shall be fitted with replaceable low-friction UHMW polyethylene wear strips. Heavy-duty roller-bearing cam rollers with grease fittings shall be fitted in each corner of the carrier base plate and roll against the guide rails for added stability.
- B. Carrier Stroke: The drill head carrier shall be driven by one double acting hydraulic cylinder with a minimum of 4-1/2” internal bore and 78” stroke. The cylinder rams shall be rigidly fixed at each end to the mast frame, causing the cylinder body to move when actuated. The cylinder body shall be fitted at each end with two leaf chain sheaves. The sheave bearings shall be adequately sized needle bearings to withstand forces imposed by the feed system. The sheave bearings shall be sealed from the elements and provisions for lubricating the sheave bearings without disassembly or removal from the machine shall be provided. Four lengths of high-strength leaf chain shall be affixed to an anchor point on the drill head carrier. Each chain will extend from the anchor point, around its respective cylinder body sheave and anchor to a central point on the drill mast frame, resulting in a 2:1 ratio between drill head carrier and cylinder movement. Provisions for individual feed chain tension adjustments shall be furnished in a location easily accessible to maintenance personnel.
- C. Control Valve: Drill head movement shall be controlled by a four position control valve with detents. The valve shall control the following movements of the drill head.
- Power up.
 - Power down.
 - Hold
 - Float
- D. Hydraulic Controls: Shall be furnished at the operator’s control panel to modulate both the downward feed cylinder hydraulic pressure as well as the rate of movement.

15. **Mast:**

- A. Mast: The mast frame shall be constructed of ASTM A-500 grade B rectangular or round steel tubing sized to withstand the combined loading of drill rotation, feed, and hoisting components. The frame shall guide and position the drill head centrally at the rear of the machine. The mast shall collapse into a horizontal travel position and shall be positioned by two double acting hydraulic cylinders with internal bore not less than 3-1/2”. The cylinders shall be furnished with orifice fittings to ensure slow, controlled movement. The mast shall be capable of drilling at any angle from 45 degrees to 90 degrees vertical and shall include provisions to prevent collapse in the event of hydraulic system failure at any angle within this range.

- B. Mast Extension: The drill rig shall be equipped with a removable top mast extension providing a minimum of 25ft between the bottom of the mast and the crown block sheaves.
- C. Mast Dump: The drill mast shall incorporate a mast dump mechanism allowing the mast and feed system to be positioned closer to the ground during angle drilling operations or when drilling on uneven terrain. The mast dump shall be actuated by a hydraulic cylinder with bore diameter of not less than 3". Total mast dump travel shall be no less than 5 ft. The mast dump shall incorporate a manually operated locking mechanism to prevent unintentional movement.
- D. Crown Block: The drill rig shall be equipped with a wire rope sheave block at the top of the mast. The crown block shall include 8" diameter steel sheaves with roller bearings sized for each wire rope size and aligned with the drill string centerline. The crown block shall include provisions to easily lubricate sheave bearings without disassembly or removal of wire rope.

16. Rod Vise (Telescoping):

- A. Rod Vise: A rod clamping device shall be provided that has a minimum clamping force of 8,000 lbs. The rod vise shall mount to the mast lifting frame work or bottom of the feed frame and extend below the drill head. The vertical positioning of the vise shall be adjustable as to provide sufficient clearance below the head as to not impede travel when equipped with typical tooling, adapters, and accessories regardless of mast dump position.
- B. Clamp: The clamping mechanism shall consist of two horizontally opposed hydraulic cylinders arranged on either side of the drill string and mounted within a strong, rigid housing. The front of the housing shall remain open as to allow for the passage of drill rod or other similar tooling. The clamping mechanism shall telescope rearward into the clamping position or forward away from the drill string to provide clearance for other drilling operations as desired. The telescoping function shall be actuated by hydraulic cylinder.
- C. Jaws: The rod vise shall be designed to accept removable and replaceable jaws of various sizes. With appropriate jaws, the vise shall be capable of clamping tooling from 1 1/4" to 4-1/2" in diameter. Two sets of jaws shall be provided.
- D. Accumulator: The clamping leg of the rod vise hydraulic circuit shall incorporate a hydraulic accumulator to ensure adequate clamping force is maintained at all times. A manually operated bypass valve shall be provided to allow the release of stored energy prior to maintenance on the hydraulic circuit.

17. Slide Base:

- A. In/Out Slide Base: The drill unit shall slide in and out on a longitudinal slide base with travel distance not less than 15". The slide base shall be actuated by dual hydraulic cylinders with bore diameter not less than 2". The slide base shall incorporate UHMW polyethylene wear strips between primary sliding surfaces. All guide and retaining components shall include grease fittings for ease of lubrication.
- B. Lateral Slide Base: The drill unit shall slide side to side at the rear end of the machine about a pivot at the opposite end of the drill unit base. The lateral slide travel shall not be less than 4" from center in either direction. The lateral slide base shall be actuated by a hydraulic cylinder with bore diameter not less than 2-1/2" mounted to the undercarriage frame. All guide and retaining components shall include grease fittings for ease of lubrication.

18. Draw Works:

- A. The drill rig shall include a minimum 12,000 lb. capacity (bare-drum) hydraulic motor driven planetary hoist with rapid reverse function and integrated wet-disc, spring-applied, hydraulically released static brake.

Bare-drum hoisting speeds at full engine throttle shall be no less than 40 ft. /min. Bare-drum lowering speeds at full engine throttle shall be no less than 150 ft/min. The hoist shall be outfitted with a minimum of 150' of ½" diameter wire rope and locking swivel hook.

- B. The drill rig shall include a minimum 2,200 lb. capacity (bare-drum) hydraulic motor driven planetary hoist with integrated wet disc, spring applied, hydraulically released static brake. Bare-drum line speeds at full engine throttle shall be no less than 80 ft/min. The hoist shall be outfitted with a minimum of 75' of 3/8" diameter wire rope and locking swivel hook.
- C. The drill rig shall include a minimum 800 lb. capacity (bare-drum) hydraulic motor driven hoist with integrated wet disc, spring applied, hydraulically released static brake. Bare-drum line speeds at full engine throttle shall be no less than 350 ft/min. The hoist shall be outfitted with a minimum of 1000' of 3/16" diameter wire rope.
- D. The drill rig shall include a minimum 1800 lb. capacity (bare-drum) hydraulic motor driven planetary hoist with integrated wet disc, spring applied, hydraulically released static brake. Bare-drum line speeds at full engine throttle shall be no less than 200 ft. /min. The hoist shall be outfitted with a minimum of 60' of 3/8" diameter wire rope.

19. Drill Drive:

- A. Hydraulic Pump: The drill head rotation shall be driven by closed loop hydrostatic transmission. The diesel engine shall power a fully-reversible variable displacement hydraulic piston pump with integral charge pump. The pump shall utilize a proportional electro-hydraulic displacement control actuated by a compatible control handle conveniently located at the operator control panel. The control handle shall incorporate a spring-loaded neutral lockout collar designed to prevent accidental actuation as well as rapid reversal of direction, and shall also assist in quickly and accurately returning the control to the neutral position from either direction. For added safety, the pump displacement control shall be designed so that loss of a control signal immediately and automatically returns the pump swash plate to the neutral position.
- B. Hydraulic Motor: The drill head drivetrain shall consist of a selectable two-speed bent-axis variable displacement piston motor with integrated loop flushing valve. Motor speed shall be actuated by electro-hydraulic solenoid valve and selectable via a weather-resistant 2-position electrical switch conveniently located at the operator control panel.
- C. Mechanical Transmission: The hydraulic motor shall be mounted atop a four-speed mechanical transmission resulting in a total of at least 8 speed ranges. Drill head output shall range from a minimum of 8000 lb-ft torque in the lowest gear to a minimum of 425 lb-ft in the highest gear. The drill head rotation speed shall be no more than 60 rpm in the lowest gear and no less than 1000 rpm in the highest gear.

20. Drill Head:

- A. Spindle: The drill head shall incorporate a 4-5/8" bore open spindle and accept all rod and casing sizes up to "P" wireline or "H" casing. The spindle bottom flange shall allow for rapid attachment of various bushings, rod adapters, auger adapters, universal adapters, and other various adapters. The spindle shall include provisions for the mounting of rod bushings, a hydraulic chuck, or other adapters above the drill head and shall be keyed and/or bolted to allow for transfer of torque in both the forward and reverse directions. The spindle shall be designed in such a way that the spindle bearings and seals can be replaced without removing the spindle from the drill head assembly.
- B. Drill Head Slide: The drill head shall incorporate a hydraulically actuated slide feature to provide clear access for tool handling and SPT hammer operations. Drill head slide travel shall be adequate to clear the area above the drill string and shall be no less than 12".

- C. Oil Pump: The drill head shall incorporate an oil circulation pump which provides lubricating oil to drill head and transmission internal parts. The lubricant system shall incorporate an oil pump with integrated relief valve and full-flow oil filter. The circulation pump shall be driven by the final drive input shaft. A provision will be provided to the operator to visually confirm lubricating oil flow operation.

21. Control Panel:

- A. Panel: An operator's control panel shall be located conveniently at the rear of the machine, to the left of and within view of the drill string centerline. The control panel shall contain all necessary controls to operate all setup, drilling, and accessory functions of the machine, and shall contain all engine monitoring gauges or displays as well as engine start/stop, throttle controls and emergency stop switch. The unit shall be equipped with a keyed ignition switches in the drill control panel. The engine shall power both the carrier and the drill.
- B. Valves: Hydraulic control valves shall be manually operated full-flow valves. Controls shall be ergonomically grouped and arranged to put the most frequently used controls within easiest reach of the operator. Setup functions including leveling jacks and mast positioning controls shall be grouped separately to lessen the likelihood of accidental actuation during routine drilling operations. Valves shall be oriented to make each component move or slide in the same general direction as the valve handle when it is moved by the operator.
- C. Gauges: The control panel shall contain hydraulic pressure gauges to monitor the flowing circuits; feed cylinder downward pressure, rotation circuit pressure, water pump hydraulic pressure, and water pressure for gauges for both water/mud pumps, left tram circuit pressure, right tram circuit pressure, as well as charge pump pressure for each closed loop pump.
- D. Platform: The controls of the panel shall incorporate a folding operator's platform for standing. The platform shall incorporate a heavy-duty non-slip surface. The platform shall fold to stow easily away during transport and shall unfold to the horizontal position for drilling operations.
- E. Power Outlet: Shall include a 12 volt power point outlet in the drillers console area.

22. Water Pumps/Mud Pumps:

- A. Hydraulic System: The water pump hydraulic circuit shall be driven by an independent fixed-displacement gear pump. A suitable hydraulic control valve shall be provided, conveniently located at the operators control panel. The control valve shall include provisions for full-flow forward and reverse pump operation as well as a proportional pressure compensated speed adjustment control.
- B. Controls: The drill rig shall be fitted with dual water pumps. The active water pump shall be selected by way of a suitable manually operated, two position, 6 way, hydraulic selector valve. The selector valve shall be located in an easily accessible location away from the operator's control panel to prevent accidental control handle actuation.
- C. High Volume Pump: The drill rig shall include a Gardner Denver FF-FXF-4-1/2" diameter x 5 stroke duplex piston pump. The combined water pump and driving hydraulic circuit shall be capable of generating a water pump output flow rate of 120 GPM at 200 psi outlet pressure. The water pump shall be fitted with an appropriate surge chamber, safety relief valve, and outlet pressure gauge, located at or above the operations control panel.
- D. Low Volume Pump: The drill rig shall include an FMC Bean L1122 triplex piston pump with 2.5" NPT inlet and 1.25" NPT outlet. The combined water pump and driving hydraulic circuit shall be capable of generating a water pump output flow rate of 35 GPM at 425 psi outlet pressure. The water pump shall be

fitted with an appropriate surge chamber, safety relief valve and outlet pressure gauge, located at or above the operations control panel.

- 23. Standpipe With Hose To Control Panel:** A 2" diameter standpipe shall be mounted on the upright drill frame and connected by a 2" high pressure hose to the mud pump output.
- 24. Vandalism Protection:** Shall be equipped with vandalism protection including the following items as a minimum:
- A. Lockable engine side panels or enclosure.
 - B. Lockable instrument panel.
 - C. Lockable filler caps for the hydraulic tank, fuel tank(s) and radiator. Filler caps located behind locking panels or inside engine enclosure are acceptable in lieu of individual locking caps.
 - D. Lockable battery box cover(s) if battery is not located inside engine enclosure.
- 25. Drill Tools and Augers:** All drill tools and accessories shall be of the highest quality according to the standards of the drill tool industry. All couplings for the hollow augers, hollow auger stems and adaptor caps shall be of the slip-fit dual key or octagonal (HD) type, and shall be capable of withstanding the full rotary torque of the drill rig when rotated either forward or reverse. Auger couplings and keys shall be heat treated alloy steel. The hollow stem auger flight edges shall be hard surfaced over the complete length. Hollow auger heads shall be cast and machined to fit the lead auger sections and shall have easily replaceable bits. The bits shall be drop forged alloy steel and heat treated. Each bit shall have a carbide insert cutting surface that is silver soldered to the bit.

The following drill tools and augers shall be provided as a minimum, any other tools required for the efficient operation of the unit shall also be provided;

- 30 ea. 4.25" ID x 8.25" OD X 5' length hollow stem auger with (HD) type keyed or octagonal couplings and two (2) auger connectors. The flighting shall be hard surfaced over the complete length.
- 2 ea. 4.25" ID X 9.00" OD hollow auger head with (HD) type keyed or octagonal coupling, including our (4) carbide tipped bullet teeth.
- 1ea. Slide connector 4.25" CME HD male pin with a 4.25" (HD) female box with a sliding 1.625" f female hex connection.
- 18 ea. 1.625" hex x 5' drill stem with drive pin.
- 1 ea. Lead center stem 4.25" LH reverse flight, with 1.625" hex male pin on top and 1.625" female box on bottom.
- 2 ea. 4.25" ID x 8.25" OD x 2' length hollow stem auger with (HD) type keyed or octagonal coupling with two (2) auger connectors. The flighting shall be hard surfaced over the complete length.
- 1 ea. Hollow auger stem, 4.25" ID HD x 2' length.
- 1 ea. Hollow auger retriever, 4.25" ID, with HD type keyed or octagonal coupling.
- 1 ea. Auger fork, 4.25" HSA.
- 1 ea. Auger connector wrench HD.
- 1 ea. Auger hoisting hook.
- 1 ea. Insert tap HD.
- 1 ea. Hoisting socket for 1.625" hex stem.
- 18 ea. Drive pin DP2000 short.
- 1 ea. Insert thread tap for the auger connector bolt hole.

- 15 ea. Drill Rod NWJ, 10'.
- 2 ea. Drill Rod NWJ, 5'.
- 15 ea. Drill Rod AWJ, 10'.
- 2 ea. Drill Rod AWJ, 5'.
- 1 ea. Drill Rod AWJ, 2'.
- 1 ea. Hoisting swivel, AWJ.
- 1 ea. Outside recovery tap, NWJ.
- 1 ea. Outside recovery tap, AWJ.
- 1 ea. Hammer for auger drive pins.
- 1 ea. Hoisting swivel, NWJ.

26. **Mud Pit:** Shall be constructed from no less than 9 gauge aluminum and have lifting loops, settling baffles, a removable aluminum screen box and two (2) 2" threaded outlets. Shall have a minimum capacity of 150 gallons. Dimensions shall be approximately 36" wide x 84" long x 12" high. Shall have a 10-1/2" diameter drill hole and a removable walkway. Mud pit shall be compatible with the drill rig.
27. **Warranty:** Units purchased under this specification shall be warranted against defects in material and workmanship for a minimum period of twelve (12) months (365 days) from date unit is placed in operation by AHTD.
- A. Warranty shall include all parts, labor and transportation costs to the location of equipment.
 - B. If equipment cannot be repaired on location, warranty shall include cost of transport to the facility where the repair work will be done.
 - C. It will be the responsibility of the successful bidder to insure that repairs are completed in a timely manner.
 - D. If any warranty literature submitted with the bid conflicts with AHTD warranty requirements, the conflict(s) shall be specifically noted, corrected and included with the bid or the conflict(s) will be considered an exception to warranty specifications and the bid rejected.
 - E. Recent prior failure to provide warranty-work, parts, replacement parts or service, in a timely manner, for equipment from the same manufacturer or dealer shall be grounds for the rejection of any submitted bid, or for the denial of any otherwise qualified low bidder, whether such failure is attributable to the manufacturer or the dealer of the equipment. For the purposes of this paragraph "timely manner" means a period of time not exceeding thirty (30) calendar days to provide requested warranty-work, parts, replacement parts, or service. For the purposes of this paragraph "manufacturer" means the original manufacturer of the equipment and its successor or successors, regardless of number, and whether acquired by sale, merger, or otherwise. For the purposes of this paragraph "replacement part" means a part redesigned by a manufacturer to correct a design or engineering defect and which replacement part is capable of providing dependable performance in normal operation conditions for its normal service life without failure. Such bid or bids may be rejected by the Department until such failure or failures have been remedied to the satisfaction of the Department and until such manufacturer or dealer is providing such warranty-work, parts, replacement parts, and service in a timely manner.