Technical Specifications for Drilling Borehole

Scope of work and Specifications:

The contractor will provide the drilling rig and related equipment/tools/accessories to drill to the intended depth using mud rotary drilling system and develop the well by backwashing and air compressor.

Works involves constructing and completing successfully drilled deep borehole including installation of ASTM plain casing 12 inch, and stainless steel, continuous slot Johnson screen 12 inch, 5.8 m long, and slot opening is 0.016 or 0.020˝ inches and sand trap, gravel pack at appropriate intervals and back fill, close near surface water table aquifer, cleaning and development of side boreholes, conduct pumping test (step drawdown, continuous, recovery).

chlorinate borehole, construct apron with drainage and soak away pit in accordance with this specification and to any further details as may be ordered by Zoa. The contractor must have all equipment required to test the borehole which he can remove after testing and chlorination. The Contractor will employ only competent workmen for the execution of the works, and all such Works shall be performed under direct supervision of an expert water well driller/site supervisor.

Borehole Depth and Diameter:

Borehole will be drilled with 17 inch. The contractor will use and not less than 14.5 inches drilling bit. The first 6 meters from the surface will have concrete grouting for sanitary protection (To be done by the contractor). For this the borehole will be remained to a minimum, diameter of 14'' and concrete grouting placed in the annular space between the casing and open borehole wall. running a well logging test after end drilling to measures parameters like electrical, resistivity, porosity, to distinguish water bearing layers, evaluates permeability zone, optimizing well design. Penetration rates, measured as minutes per meter drilled, must be recorded for every meter in the drillers log in regard with the pressure on the tool. The CONTRACTOR must report immediately to the ENGINEER on site any changes in the penetration rate.

Plain and Screen Casing:

Install ASTM plain casing and Johnson screen 12 inch as appropriate. The plain and screen casing must be centralized in the borehole so that a minimum annular space of 2 inch exists between the borehole wall and the casing. Suitable centralizers should be provided to allow the casings to be set correctly in the center of the drilled

bore. Along the screened sections a centralizer shall be inserted at every 6- meters interval while along the plain casing the interval shall be every 12-meters interval. The Contractor will take all necessary precautions during the transportation and storage of casing pipes from their warehouse to drilling sites to prevent distortions, ending or deformation of the pipe that could result in eccentricity along the length of the pipe.

Gravel Pack:

The contractor shall supply suitable gravel pack. The gravel pack shall consist of well-rounded particles of uniform grading with 90% siliceous material and conform to the 2-4 mm diameter. There shall be no clay, shale's, silt, fines, excessive amounts of calcareous materials and no crushed rock. Sampling and analysis at site will be required for confirmation of delivered materials.

The gravel shall be washed before installation. Enough gravel pack shall be installed to complete cover the uppermost screen and further by additional 2-meters to allow for settling. A good supply of water should be introduced with the gravel to prevent bridging. The gravel pack shall be capped with a 2-10meter vertical column of clay seal to prevent any seepage that may contaminate aquifers with subsequent pollution of ground water. The annular space above the clay seal shall be backed filled with inert drill-cuttings/ The quantity of the gravel pack and back fill to be installed shall be measured using a suitable volumetric method as approved by the Engineer.

Sanitary Seal & cementing:

In order to provide an effective seal to the entry of contaminants, up to 3meter depth of the borehole from the surfaces shall be grouted using cement slurry with a concrete mix in the ratio of 1:2:3 of cement sand and gravel respectively. The gravel size should be not more than 6mm. Insert a 6-meter Steel casing of 14-inches diameter on to the steel casing, the protruding above ground level by at least 0,8m to facilitate installation of the submersible pump.

Bentonite granules are used to fill the annular space of the unsaturated zone, or at least the uppermost 10 meters until 1 meter below surface. The CONTRACTOR shall backfill the existing borehole to a depth specified by the ENGINEER. The backfill material will consist of clean crushed or graded gravel. All such backfill material must be approved by the ENGINEER before being used in the borehole.

Any cement, which is used, must comply with international standards and must not be older than three months. Unless otherwise instructed by the ENGINEER, a hardening agent such as calcium chloride should not be used to accelerate the

cement setting process. No less than 800 kg of cement will be used per cubic meter of water.

Capping the Borehole & Construction of Wellhead:

During borehole construction, installation, development and test pumping, the contractor shall use all reasonable measures to prevent entrance of foreign matter into the borehole. The contractor shall be responsible for any objectionable materials that may fall into the borehole and any effect it may have on water quality and/or quantity until completion of works and acceptance by the Engineer.

The Contractor shall construct a concrete platform for the borehole surface from 2-10m below the ground level, and build reinforced concrete Block rising from the surface with dimensions 80*80*60 cm, making sure the pedestal is vertical, construct concrete in layers of 100mm up to top of legs. Cover stand assembly with a cover plate and, level the ground around the pump pedestal.

Developments and Cleaning of Borehole:

Borehole development will be conducted using an airlift system with an appropriate compressor. Development shall continue until water is clean. Development shall not stop until the discharge water is clean and free of sand (i.e. less than 1 cm diameter with sand stain test in a 10liter bucket, approximately 1ppm) and the discharge rate is stable until the ENGINEER finds acceptable.

The pumping Test & Water Sampling:

Conducting a pumping test, submersible pump is selected according to the directions of the supervising engineer. The contractor shall provide all equipment to do the test (valve gate – flow meter - Inductor water level). During the tests, the CONTRACTOR shall measure and record water levels with the recommended frequency defined in the standard sheet in the pumped borehole.

Colleting sample of water by a competent person and preservation of samples in special circumstances. Taking into account that the tests are conducted on time.

The Final Report and Data:

The Contractor shall submit to the Engineer's Representative at the end of the works, a full report, including the borehole completion report, the photographic documentation and a detailed description of the following:

Progress of excavation, pipe placement, concrete, backfilling.

Detailed lithological description with photo documentation of samples.

Documentation from pumping tests including all details for the step draw-down and constant rate tests.

Results of water quality analysis.

Particulars of other materials, accessories and related materials delivered to the site and those available.

All raw data of the calibration and pumping tests including interpretation of pump tests.

-Submission with offer (Time table, job equipment related to this job, past Experience at least (5), Technical Staff (Qualification experience, CV) company profile.

-عند التقديم يرجى إرفاق كلا من (الجدول الزمني، معدات العمل المتعلقة بهذه الوظيفة، الخبرة السابقة على الأقل (5)، الكادر الفني (الخبرة التأهيلية، السيرة الذاتية) ملف الشركة