

CONSTRUCTION OF 128 BED MOTHER AND CHILD CARE HOSPITAL, MURREE

**ADDITIONAL GEOTECHNICAL INVESTIGATIONS
REVISED BILL OF QUANTITIES**

Sr. No.	Description	Unit	Qty.	Rate	Amount
A.	FIELD INVESTIGATIONS				
A1	Mobilization and demobilization of at least two (02) hydraulic wireline straight rotary core drilling rigs and one (1) heavy percussion drilling rig alongwith allied accessories at site including setting-up and shifting from one investigation point to another. The equipment shall be capable to obtain the core recovery more than 80% and to complete the investigations within the stipulated time.	L.S.	Job		
A2	Execution of four (04) boreholes upto maximum depth of 20m in overburben soils or up to the bedrock, whichever is met earlier by straight rotary/heavy precussion method.	L.M.	40		
A3	Continuous core drilling (NQWL core) in bedrock up to a maximum depth of 65 m below NSL using triple tube split core barrel, including extraction, preservation of core samples in core boxes, waxing of selected core samples, photography of rock cores and transportation of core samples to the approved laboratory.	L.M.	110		
A4	Continuous core drilling (HQWL core) in bedrock up to a maximum depth of 65 m below NSL using triple tube split core barrel, including extraction, preservation of core samples in core boxes, waxing of selected core samples, photography of rock cores and transportation of core samples to the approved laboratory.	L.M.	110		
A5	Performance of Standard Penetration Tests (SPTs) in boreholes in overburden soils as well as in shale rock (with split spoon sampler and cone attachment as deemed necessary) generally at 1 m depth interval or as necessary along with collection of SPT samples, including their labelling, packing, storage & transportation to an approved testing laboratory.	No.	20		
A6	Collection of undisturbed soil samples from boreholes through Denison/ Pitcher/ Shelby/Piston sampler, including their waxing, labelling, packing, storage & transportation to an approved testing laboratory.	No.	10		
A7	Collection of water samples from borehole (if encountered) including their labelling, packing, storage & transportation to an approved testing laboratory.	No.	3		
	Sub-Total A =				

- Preferred method of drilling would be straight rotary method. Percussion drilling would only be allowed in case of gravelly strata.
- Minimum permissible diameter of borehole is 150 mm percussion method and 101 mm wireline drilling.
- The backfilling of boreholes to their original position using cement-sand-bentonite mix is mandatory.
- SPTs shall be performed as per ASTM standard. All the disturbed/undisturbed soil samples shall be stored and tranported as per ASTM standards. The area ratio and clearance ratio of the thin walled tube, should be in strict compliance with relevant ASTM standard.
- Core recovery less than 80% shall not be acceptable. The drilling contractor shall be responsible for required recovery of rock cores during coring process. In case of poor core recovery, a supplementary borehole shall be drilled by the Contractor without any extra cost.**
- The quantities of field investigations and laboratory testing are tentative and may vary according to the actual requirement during the execution of investigations and laboratory testing.

CONSTRUCTION OF 128 BED MOTHER AND CHILD CARE HOSPITAL, MURREE
ADDITIONAL GEOTECHNICAL INVESTIGATIONS
REVISED BILL OF QUANTITIES

Sr. No.	Description	Unit	Qty.	Rate	Amount
B.	LABORATORY TESTING				
B1	*Sieve analysis for soil (12 no.) and weathered shale (8 no.)	No.	20		
B2	*Hydrometer analysis (with pretreatment)	No.	8		
B3	*Liquid and plastic limits for soil (12 no.) and weathered shale (8 no.)	No.	20		
B4	Bulk and dry density	No.	10		
B5	Consolidation	No.	8		
B6	Direct Shear (undisturbed soil samples)	No.	8		
B7	Unconfined Compression (on soil samples)	No.	8		
B8	Crushing/pulverisation rock cores (Weathered Shale) samples and preparation for Sieve Analysis, Hydrometer Analysis, Atterberg Limits and Direct shear tests	No.	8		
B9	**Direct Shear test on pulverised weathered shale samples (Fully softened and residual ϕ)	No.	2		
B10	Reduce size (diameter) of core for testing	No.	15		
B11	Uniaxial Compression (on rock samples i.e. shale, siltstone, sandstone and shale interclation with siltstone) test	No.	40		
B12	Hoek Shear Box tests on intact rock / and natrual discontinuity plane	No.	12		
B13	Hoek Triaxial test	No.	5		
B14	Point Load test	No.	10		
B15	Sonic Velocity measurements with PUNDIT	No.	5		
B16	Complete chemical analysis of water samples i.e TDS, SO ₄ , CL & pH	No.	3		
	Sub-Total B =				
	Total (A+B)=				

Name of Laboratory: _____

* The weathered shale sample shall be kneaded oven dried and thoroughly pulverized before the start of testing.

** Full saturation of the specimen, slow rate of loading and multi-reversal conditions should be observed.