

**GEOTECHNICAL INVESTIGATIONS FOR CONSTRUCTION OF WASTEWATER TREATMENT PLANT (WWTP) AT BABU SABU,
LAHORE**

GEOTECHNICAL INVESTIGATIONS

BILL OF QUANTITIES

Sr. No.	Description	Unit	Qty.	Rate (Rs.)	Amount (Rs.)
A.	FIELD INVESTIGATIONS				
A1	Mobilization and demobilization of at least two (2) straight rotary/ percussion drilling equipment along with allied accessories at site including access to site, setting up and shifting from one investigation point to another. The equipment should be sufficient enough to complete the work within scheduled time.	L.S.	Job		
A2	Execution of: <i>i) Eight (8)</i> boreholes up to a maximum depth of 10 m and <i>Two (2)</i> boreholes up to a maximum depth of 15 m at Wastewater Treatment Plant and Flood Protection Bund location <i>ii) Ten (10)</i> boreholes up to a maximum depth of 8 m along Collector Channel, in overburden soils by straight rotary method including backfilling of boreholes to their original position.	L.M.	190		
A3	Performance of Standard Penetration Tests (SPTs) in boreholes along with collection of SPT samples at 1 m interval in general, or as necessary, including their labelling, packing, storage & transportation to an approved testing laboratory.	No.	175		
A4	Collection of undisturbed soil samples from boreholes through Shelby/ Denison/Pitcher samplers, including their waxing, labelling, packing, storage & transportation to an approved testing laboratory.	No.	15		
A5	Excavation of Eight (8) testpits up to a maximum depth of 1.5 m below top of ground including backfilling of pits to original condition.	L.M.	12		
A6	Performance of field density tests by sand replacement method in testpits generally @ 1 test/pit at selected horizons including determination of insitu bulk & dry density and collection of small disturbed samples in moisture tins, determination of moisture content as well as labelling, storage and transportation of samples to the approved laboratory.	No.	8		
A7	Collection of composite bulk soil samples (minimum 60 kg) from testpits including their labelling, packing, storage & transportation to an approved laboratory.	No.	8		
A8	Collection of composite soil samples for embankment construction (50 kg at least) from nearby borrow areas including their labelling, packing, storage & transportation to an approved testing laboratory.	No.	5		
A9	Performance of field permeability tests in boreholes at various depths using constant head or falling head methods for soil column/flush bottom conditions, as appropriate.	No.	5		
A10	Collection of water samples (if encountered) from boreholes including their labelling, packing, storage & transportation to an approved testing laboratory.	No.	4		
	Sub-Total A	Rs.			
<p>Establishment of coordinates and ground elevations of all the boreholes and testpits using Total Station are included in the scope of work. The coordinates should be provided with reference to a permanent local bench mark.</p> <p>Preferred method of drilling is straight rotary drilling method. Percussion method will only be allowed in case of gravelly strata.</p> <p>All soil samples must be labelled, stored and transported as per ASTM requirements. The area ratio and clearance ratio of the thin walled tubes should be in strict compliance with relevant ASTM standard.</p>					

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Sr. No.	Description	Unit	Qty.	Rate	Amount
B.	LABORATORY TESTING			(Rs.)	(Rs.)
B1	Sieve analysis	No.	50		
B2	Hydrometer analysis	No.	10		
B3	Liquid and plastic limits	No.	20		
B4	Bulk density & dry density	No.	15		
B5	Consolidation with Swell Pressure Measurement	No.	5		
B6	Unconfined compression	No.	5		
B7	Direct Shear	No.	10		
B8	Modified AASHTO Compaction	No.	12		
B9	3-Point Soaked CBR	No.	6		
B10	Permeability Tests	No.	5		
B11	Sulphate content of soil	No.	4		
B12	Chloride content of soil	No.	4		
B13	Organic matter content of soil	No.	4		
B14	Complete chemical analysis of water samples i/c TDS, Cl, SO4 & pH	No.	4		
Sub- Total B				Rs.	
Total (A+B)=				Rs.	
Say				Rs.	