

DCP-I_ANNEXURE 4: BILL OF QUANTITIES

DORJILUNG CONTRACT PACKAGE I (DCP-I): CONSTRUCTION OF DAM, COFFER DAMS, INTAKE STRUCTURES, PLUNGE POOL, FEEDER TUNNELS, HRT FROM CHAINAGE 129 m TO 2,485 m INCLUDING CONSTRUCTION ADIT-1, CONNECTION TUNNEL TO DAM TOP & ASSOCIATED HYDRO MECHANICAL WORKS

Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
PART 1	CIVIL WORKS							
A1	B.1		Dewatering During Construction					
A1.1		V	Dewatering of Surface Construction Sites	kWh	11,504,600			
A1.2		V	Dewatering of Underground Construction Sites	kWh	570,000			
A2	B.2		Surface Excavation					
A2.1		IV	Common excavation	cum	1,285,400			
A2.2		IV	Rock excavation	cum	583,500			
A2.3		IV	Dental excavation	cum	20,230			
A2.4		IV	Minor excavation	cum	19,040			
A2.5		IV	Additional excavation					
A2.5.1		IV	- Additional common excavation	cum	39,900			
A2.5.2		IV	- Additional rock excavation	cum	17,730			
A2.6		IV	Removal of material arising from over-break accepted due to adverse geological conditions	cum	30,080			
A2.7		IV	Extra for haulage of excavated materials (beyond 3 km)	cum-km	30,665			
A2.8		IV	Control Perimeter Blasting	sqm	117,700			
A3	B.3		Underground Excavation					
A3.1			Excavation of tunnels					
A3.1.1		IV	- Type A, B and C	cum	202,000			
A3.1.2		IV	- Type D and E	cum	129,400			
A3.1.3		IV	- Type F	cum	18,300			



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						In Figures	In Words	
A3.1.4		IV	- Dam inspection galleries in rock	cum	3,000			
A3.2		IV	Excavation by multi-drift or multi-segmental method	cum	4,200			
A3.3		IV	Extra for haulage of excavated materials (beyond 3 km)	cum-km	1,455,672			
A3.4		IV	Line Drilling	m	14,500			
A3.5		IV	Dental excavation	cum	10,610			
A3.6		IV	Removal of material arising from over-break accepted due to adverse geological conditions	cum	24,500			
A4	B.4		Rock Supports					
A4.1			Expansion shell rock bolts, 25 mm dia., Grade Fe 500 (drilling included)					
A4.1.1		II	- Length up to 4.0 m	m	3,140			
A4.1.2		II	- Length more than 4.0 m and up to 6.0 m	m	3,900			
A4.2			Expansion shell rock bolts, 32 mm dia., Grade Fe 500 (drilling included)					
A4.2.1		II	- Length up to 6.0 m	m	2,420			
A4.2.2		II	- Length more than 6.0 m and up to 9.0 m	m	1,800			
A4.3			Expansion shell rock bolts, 36 mm dia., Grade Fe 500 (drilling included)					
A4.3.1		II	- Length up to 6.0 m	m	320			
A4.3.2		II	- Length more than 6.0 m and up to 9.0 m	m	1,600			
A4.3.3		II	- Length more than 9.0 m and up to 12.0 m	m	300			
A4.4		II	Rock Dowels, GFRP type, 25 mm dia.	m	8,550			
A4.5			Resin / Cement grouted rock bolts, 25 mm dia., Grade Fe 500 (drilling included)					
A4.5.1		II	- Length up to 4.0 m	m	60,200			
A4.5.2		II	- Length more than 4.0 m and up to 6.0 m	m	171,700			



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						In Figures	In Words	
A4.6			Resin / Cement grouted rock bolts, 32 mm dia., Grade Fe 500 (drilling included)					
A4.6.1		II	- Length up to 6.0 m	m	21,000			
A4.6.2		II	- Length more than 6.0 m and up to 9.0 m	m	8,300			
A4.7			Resin / Cement grouted rock bolts, 36 mm dia., Grade Fe 500 (drilling included)					
A4.7.1		II	- Length up to 6.0 m	m	800			
A4.7.2		II	- Length more than 6.0 m and up to 9.0 m	m	2,700			
A4.7.3		II	- Length more than 9.0 m and up to 12.0 m	m	4,000			
A4.8			Rock Anchors, 25 mm dia., Grade Fe 500 (drilling included)					
A4.8.1		II	- Length up to 4.0 m	m	3,520			
A4.8.2		II	- Length more than 4.0 m and up to 6.0 m	m	3,130			
A4.9			Rock Anchors, 32 mm dia., Grade Fe 500 (drilling included)					
A4.9.1		II	- Length up to 6.0 m	m	1,070			
A4.9.2		II	- Length more than 6.0 m and up to 9.0 m	m	8,740			
A4.9.3		II	- Length 9.0 m and up to 12.0 m	m	13,770			
A4.10			Rock Anchors, 36 mm dia., Grade Fe 500 (drilling included)					
A4.10.1		II	- Length more than 6.0 m and up to 9.0 m	m	540			
A4.10.2		II	- Length 9.0 m and up to 12.0 m	m	870			
A4.11		II	Water expandable friction anchors (3 m - 6 m)	m	2,100			
A4.12			Self drilling Hollow core anchors					
A4.12.1		II	- 25 mm dia. / length up to 6.0 m	m	1,620			
A4.12.2		II	- 32 mm dia. / length up to 9.0 m	m	4,320			
A4.12.3		II	- 32 mm dia. / length more than 9m and up to 15.0 m	m	1,250			
A4.13			Grouted anchor bars (drilling included)					
A4.13.1		II	- 25 mm dia. / length up to 4m	m	1,020			



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						In Figures	In Words	
A4.13.2		II	- 25 mm dia. / length up to 9m	m	14,400			
A4.13.3		II	- 32 mm dia. / length up to 6m	m	824			
A4.13.4		II	- 36 mm dia. / length up to 9m	m	736			
A4.14		II	Rock bolt or rock anchor extensions into concrete (welded)	kg	230			
A4.15		V	Testing and monitoring of reinforcing elements	nos.	1,760			
A4.16		I	Miscellaneous steel profiles used in conjunction with rock reinforcement	MT	17			
A4.17			Mesh reinforcement					
A4.17.1		II	- Chain link fabric	sqm	2,930			
A4.17.2		II	- Welded wiremesh	sqm	17,990			
A4.18		I	Lattice girder	MT	433			
A4.19		I	Steel ribs, supply and installation (including accessories)	MT	1,437			
A4.20			Lagging					
A4.20.1		I	- Steel Lagging	MT	272			
A4.20.2		III	- Concrete Lagging	cum	6,880			
A4.21			Pre-grouting					
A4.21.1		V	- Drilling of holes of 45 / 57 mm diameter	m	51,430			
A4.21.2		V	- Grouting operations	nos.	10,280			
A4.22			Fore poling					
A4.22.1		I	- Installation of fore poles	m	8,400			
A4.22.2		V	- Grouting of fore poles	nos.	570			
A4.23		II	Pipe roofing	kg	65,980			
A4.24		V	Drilling of the pre-drainage holes	m	26,000			
A4.25		II	Soil nails	m	120			
A4.26		II	Post tensioned rock bolts	m	8,000			
A4.27		V	Protective coating (galvanization and epoxy)	kg	120			



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A5	B.5		Shotcrete					
A5.1		III	SFR shotcrete (Underground works)	cum	20,180			
A5.2		III	SFR shotcrete (Surface works)	cum	650			
A5.3		III	Plain shotcrete	cum	11,720			
A5.4		III	Variation in cement content*	kg	321,100			
A5.5		V	Superplasticiser	kg	107,000			
A5.6		V	Steel fibres	kg	729,200			
A5.7		V	Micro silica	kg	1,041,500			
			* Quantity of cement variation may be both negative as well positive during the actual execution depending upon the mix design					
A6	B.6		Backfill					
A6.1			Embankment construction Upstream/ Downstream					
A6.1.1		IV	- Zone 1A: Silty Sand (SM) + Silt/Fat Clay (CH)	cum	5,800			
A6.1.2		IV	- Zone 2B: Phyllite — transition to membrane	cum	8,500			
A6.1.3		IV	- Zone 3A: Selected Quartzite — drainage filter transition	cum	29,200			
A6.1.4		IV	- Zone 3B: Main Rockfill Quartzite	cum	211,000			
A6.1.5		IV	- Zone 1B: Well graded Sand (SW) / Gravel (GW)	cum	34,600			
A6.1.6		IV	- Zone 4: Rip-Rap Quartzite		4,100			
A6.2			Backfill / fill					
A6.2.1		IV	- Random Backfill	cum	1,000			
A6.2.2		IV	- Compacted Backfill	cum	18,700			
A6.2.3		IV	- Free Draining Backfill	cum	500			
A6.2.4		IV	- Sand gravel Backfill / fill	cum	500			
A6.3		IV	Geomembrane	sqm	13,800			
A6.4			Foundation preparation					



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A6.4.1		IV	- for embankment	sqm	17,500			
A6.4.2		IV	- for RCC blocks and concrete cofferdam structures	sqm	2,100			
A7	B.7		Drilling, Grouting and Pressure Relief Holes					
A7.1			Drilling for contact/ consolidation grouting in underground structures					
A7.1.1		V	- Contact grouting holes	m	3,630			
A7.1.2		V	- Consolidation grouting holes	m	24,100			
A7.1.3		V	- Rotary Drilling (NON-CORED) of 45 mm dia grout holes	m	9,930			
A7.1.4		V	- Re-drilling for consolidation grouting where the grout has been allowed by the Engineer-in-Charge	m	3,520			
A7.1.5		V	- Percussion Drilling of 45mm / 57 mm dia grout holes for pre-grouting	m	200			
A7.2			Drilling of pressure relief / drainage holes					
A7.2.1		V	- Percussion Drilling of 45mm dia. Holes including washing out of the hole	m	62,700			
A7.2.2		V	- Supply and installation of slotted PVC pipes / liner	m	43,700			
A7.2.3		V	- Re-drilling to set at the direction of the Engineer-in-Charge (50% of rate in 7.2.1)	m	4,260			
A7.2.4		V	- Percussion Drilling of 200mm dia. Holes in dam body and foundation including the washing out of the hole	m	11,800			
A7.2.5		V	- Re-drilling to set at the direction of the Engineer-in-Charge (50% of rate in 7.2.4)	m	1,200			
A7.2.6		V	- Supply and installation of 200 mm dia perforated PVC pipes in rock galleries	m	600			
A7.2.7		V	- Supply and installation of drain holes outlet devices.	m	740			



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A7.3			<i>Drilling of exploratory holes, check holes, and holes for instrumentation at any inclination</i>					
A7.3.1		V	<i>- 45 mm minimum hole diameter with and without core recovery</i>	m	4,120			
A7.3.2		V	<i>- 76 mm minimum hole diameter with and without core recovery</i>	m	2,150			
A7.3.3		V	<i>- 115 mm minimum hole diameter with and without core recovery</i>	m	1,407			
A7.3.4		V	<i>- 98 mm minimum hole diameter with and without core recovery</i>	m	2,300			
A7.3.5		V	<i>- 150 mm minimum hole diameter with and without core recovery</i>	m	1,400			
A7.3.6		V	<i>- 400 mm minimum hole diameter with and without core recovery</i>	m	100			
A7.3.7		V	<i>- Extra over for drilling with triple tube core barrels</i>	m	318			
A7.3.8		V	<i>- Core recovery and logging for exploratory holes ordered by the Engineer-in-Charge</i>	m	450			
A7.4		V	<i>Water pressure testing - Lugeon water test</i>	nos.	1,244			
A7.5		I	<i>Embedded steel pipes and fittings for grouting (left in place)</i>	kg	974			
A7.6		V	<i>Drilling for probe holes (≥ 50 mm dia.)</i>	m	574			
A7.7			<i>Placing grout (excluding cement)</i>					
A7.7.1		III	<i>- Contact grouting</i>	nos.	3,450			
A7.7.2		III	<i>- Fill grouting of temporary drainage system</i>	m	1,035			
A7.7.3		III	<i>- Fill grouting of exploratory or control holes where directed by the Engineer-in-Charge</i>	m	1,035			
A7.7.4		III	<i>- Consolidation grouting and pre-grouting in single stage</i>	nos.	34,110			
A7.7.5		III	<i>- Consolidation grouting and pre-grouting in multiple stage</i>	nos.	24,210			
A7.8			<i>Grouting materials</i>					
A7.8.1		III	<i>- Cement</i>	MT	3,091			



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A7.8.2		IV	- Sand	MT	289			
A7.8.3		V	- Bentonite	MT	70			
A7.8.4		V	- Admixtures	kg	34,750			
A7.8.5		III	- Micro fine / Ultra fine Cement	kg	705,700			
A7.8.6		V	- Colloidal Silica / Other Chemicals	kg	42,850			
A7.9			Drilling for curtain grout					
A7.9.1		V	- Rotary Drilling with core recovery RCC+rock, including exploratory holes	m	700			
A7.9.2		V	- Rotary Drilling (NON-CORED) of curtain grout in 45 mm dia in RCC+rock	m	17,000			
A7.9.3		V	- Re-drilling for curtain grouting where the grout has been allowed to set at the direction of the Engineer-in-Charge (50% of rate in 7.9.2) 48 mm rotary (non-cored)	m	900			
A7.10		V	Drilling for contact / consolidation grouting or pre-grouting					
A7.10.1		V	- Rotary Drilling (NON-CORED) of 45 mm dia grout holes	m	44,800			
A7.10.2		V	- Re-drilling for consolidation grouting where the grout has been allowed by the Engineer-in-Charge	m	4,500			
A7.10.3		V	- Percussion Drilling of 45mm / 57 mm dia grout holes for pre-grouting	m	200			
A8	B.8		Seepage Cutoff					
A8.1		IV	Trench excavation for cut-off wall - alluvium/ colluvium/ overburden	sqm	8,400			
A8.2		IV	Trench excavation for cut-off wall - bedrock	sqm	400			
A8.3		III	Placement of plastic concrete in cut-off wall	sqm	8,700			
A9	B.9		Concrete					



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A9.1			Class M40 / A20					
A9.1.1		III	- Second Stage Concreting and concrete in blockouts for equipment embedding	cum	4,900			
A9.1.2		III	- Self compacting concrete zoning of steel liners at inlet	cum	600			
A9.2			Class M30 / A20					
A9.2.1		III	- Self compacting concrete behind steel liners	cum	600			
A9.2.2		III	- Dam (Surface Works)	cum	258,000			
A9.2.3		III	- Dam Inspection Galleries (Underground Works)	cum	1,100			
A9.2.4		III	- Plunge pool slab (surface works)	cum	15,000			
A9.3			Class M25 / A40					
A9.3.1		III	- Concrete Lining of Tunnels invert	cum	30,500			
A9.3.2		III	- portal structures	cum	21,018			
A9.3.3		III	- Inlet and/or outlet transition	cum	18			
A9.3.4		III	- Dam	cum	136,000			
A9.3.5		III	- Dam Inspection Galleries (Underground Works)	cum	35			
A9.3.6		III	- Pavement Concrete	cum	12,600			
A9.4			Class M25 / A20					
A9.4.1		III	- Concrete Lining of Tunnels overt	cum	31,200			
A9.4.2		III	- Portals	cum	160			
A9.4.3		III	- Concrete curbs for membrane placement (U/S Cofferdam)	cum	2,900			
A9.4.4		III	- Sidewalls (U/S Cofferdam)	cum	700			
A9.5			Class M20 / A40					
A9.5.1		III	- Concrete plugs	cum	2,000			
A9.5.2		III	- Dam	cum	22,200			
A9.5.3		III	- Concrete Guide Walls (cut-off wall trench)	cum	200			
A9.6			Class M15 / A80					
A9.6.1		III	- Backfill concrete in surface works	cum	29,230			



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A9.7			Class M15 / A40					
A9.7.1		III	- Backfill concrete behind liners in tunnels in geologically approved overbreaks	cum	24,000			
A9.7.2		III	- Mass concrete	cum	557			
A9.7.3		III	- Lean and plum concrete	cum	18,000			
A9.8		III	Cement variation in concrete	kg	739,900			
A9.9		III	Superplasticizer	kg	985,200			
A9.10		III	Class M35 / A40	cum	7,700			
A9.11		III	HPC Class M60 / A40	cum	5,200			
A9.12			Precast Concrete					
A9.12.1		III	- Precast Concrete M25 / A20	cum	5,600			
A9.13		III	Porous Concrete	cum	1,700			
A9.14			Structural Repair works/ Closure of grout holes					
A9.14.1		III	- Cementitious mortar	kg	1,100			
A9.15			Water proofing Treatment works					
A9.15.1		V	- Crystalline Slurry	sqm	1,600			
A9.15.2		V	- Crystalline mortar	sqm	1,600			
A9.16		V	- Non-Shrink epoxy mortar	kg	5,200			
A9.17			Grouting of the equipment bearing plates and anchors					
A9.17.1		III	- Non shrink cement based grout	kg	75,500			
A9.17.2		V	- Non-shrink epoxy based grout	kg	8,000			
A9.18		III	Slush Grout	cum	1,900,000			
A9.19			Bridge ancillaries					
A9.19.1		V	- Elastomeric bearing pads	nos.	40			
A10	B.10		NOT USED					
A11	B.11		Reinforcing Steel					



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A11.1		II	Reinforcing Bars	MT	56,530			
A11.2			Couplers					
A11.2.1		II	- 32 mm dia.	nos.	452,700			
A11.2.2		II	- 36 mm dia.	nos.	355,100			
A12	B.12		Waterstop and Joints in concrete structures					
A12.1		V	PVC waterstop	m	17,850			
A12.2			Joint filler					
A12.2.1		V	- 12 mm thick	sqm	1,650			
A12.2.2		V	- 24 mm thick	sqm	800			
A12.2.3		V	- 10 mm thick (expanded polystyrene)	sqm	800			
A12.3		V	Joint sealant	m	4,500			
A12.4		V	Bituminous coating	sqm	1,750			
A13	B.13		Metalworks					
A13.1		I	Steel pipes	kg	505,000			
A13.2		I	Miscellaneous steel sections	kg	105,000			
A13.3		I	Steel covers and frames	kg	6,400			
A13.4		I	Steel gratings	kg	6,400			
A13.5			Hand rail and Railings					
A13.5.1		I	- Handrails and railings (GI pipe)	kg	26,100			
A13.5.2		I	- Hand rail and Railing (Stainless steel)	kg	10,000			
A13.6		I	Ladders and climbing irons with protection cage	kg	11,400			
A13.7		I	Erection books	kg	2,900			
A13.8		I	Steel anchoring	kg	2,900			
A13.9		I	Guardrails	kg	3,000			
A14	B.14		NOT USED					



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						In Figures	In Words	
A15	B.15		Building and Architecture					
A15.1		V	<i>Dam Complex and Control Building</i>	L.S.	1			
A16	B.16		Miscellaneous and Ancillary Works					
A16.1			<i>Fencing and gates</i>					
A16.1.1		I	<i>- Fencing</i>	m	555			
A16.1.2		I	<i>- Gates</i>	MT	10			
A16.2			<i>Concrete Pipes</i>					
A16.2.1		III	<i>- 200 mm dia fully embedded in concrete</i>	m	474			
A16.2.2		III	<i>- 300 mm dia fully embedded in concrete</i>	m	200			
A16.2.3		III	<i>- 400 mm dia fully embedded in concrete</i>	m	100			
A16.2.4		III	<i>- 500 mm dia fully embedded in concrete</i>	m	135			
A16.2.5		III	<i>- 200 mm dia on concrete / sand base</i>	m	474			
A16.2.6		III	<i>- 300 mm dia on concrete / sand base</i>	m	200			
A16.2.7		III	<i>- 400 mm dia on concrete / sand base</i>	m	100			
A16.3			<i>PVC Pipes</i>					
A16.3.1		V	<i>- 50 mm dia.</i>	m	7,900			
A16.3.2		V	<i>- 75 mm dia.</i>	m	7,900			
A16.3.3		V	<i>- 100 mm dia.</i>	m	6,400			
A16.3.4		V	<i>- 200 mm dia.</i>	m	2,900			
A16.3.5		V	<i>- 300 mm dia.</i>	m	1,400			
A16.4		V	<i>Weep Holes</i>	nos.	1,036			
A16.5		III	<i>Concrete cable channels</i>	cum	500			
A16.6			<i>SWG pipes</i>					
A16.6.1		V	<i>-150 mm dia</i>	m	1,000			
A16.6.2		V	<i>-200 mm dia</i>	m	500			
A16.6.3		V	<i>-300 mm dia</i>	m	500			



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						In Figures	In Words	
A16.6.4		V	-350 mm dia	m	250			
A16.6.5		V	-400 mm dia	m	250			
A16.7		V	Geotextile	sqm	33,000			
A16.8		V	Heavy-Duty floating reservoir debris barrier (Tuff Boom) System	Set	1			
A17	B.17		Slope Protection					
A17.1		IV	Rock paving	cum	620			
A17.2		IV	Stone Pitching	cum	1,940			
A17.3			Gabions					
A17.3.1		V	- Gabions / Wire crates	sqm	14,200			
A17.3.2		V	- Boulder filling	cum	1,420			
A17.4			Random rubble masonry					
A17.4.1		V	- Wet Masonry	cum	5,770			
A17.4.2		V	- Dry Masonry	cum	2,030			
A17.5		III	Precast Concrete Blocks	cum	1,220			
A17.6		V	Rockfall protection barrier	m	1,340			
A17.7		V	Slope protection Netting	sqm	1,540			
A17.8			Bio-Engineering Measures					
A17.8.1		V	- Wattling Trenches	m	540			
A17.8.2		V	- Mulching / Plantation of Grass / Shrubs	sqm	2,850			
A17.8.3		V	- Jute-Geo Textile	sqm	1,140			
A17.8.4		V	- Balley Benching	nos.	570			
A17.8.5		V	- Bamboo Piling	nos.	570			
A17.9			Polymer Rope Gabions					
A17.9.1		V	- Size 1m x 1m x 1m	nos.	150			
A17.9.2		V	- Size 2m x 2m x 1.5m	nos.	50			
A18	B.18		Monitoring Instruments					



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A18.1		V	Topographical markers	nos.	85			
A18.2		V	Load cells	nos.	68			
A18.3		V	Convergence measurement including optical techniques	nos.	146			
A18.4		V	Single and multiple point borehole extensometers	nos.	63			
A18.5		V	Pore pressure meters (Piezometers)	nos.	83			
A18.6		V	Total pressure cells	nos.	44			
A18.7		V	Water level measuring automatic and gauge-mechanical type	nos.	8			
A18.8		V	Readout Unit for Electrical Instruments	nos.	8			
A18.9		V	Joint meters - linear and triaxial	nos.	16			
A18.10		V	Distributed temperature and strain sensors, thermocouples and reservoir thermometers	nos.	142			
A18.11		V	Uplift measuring device (stand pipe piezometers)	nos.	40			
A18.12		V	Group of strain gauges	nos.	36			
A18.13		V	Direct pendulum	nos.	2			
A18.14		V	Inverted pendulum	nos.	1			
A18.15		V	Collimation system	nos.	1			
A18.16		V	Seepage measuring system - mechanical type	nos.	7			
A18.17		V	Strong motion accelerograph	nos.	2			
A18.18		V	Weather station	nos.	1			
A18.19		V	Tilt meter	nos.	15			
A18.20		V	Alarm	nos.	18			
A18.21		V	Acquisition unit for fiber-optic cable (DCU)	nos.	2			
A18.22		V	Data acquisition system and Web based data monitoring services (ADAS)	L.S.	1			
A18.23		V	Microseismograph	nos.	2			
A18.24		V	Cables (including cable splicing kits, junction boxes, switch boxes, protection arrangements and other necessary accessories etc.)	L.S.	1			
A18.25		V	No-stress strain meters	nos.	12			



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A18.26		V	<i>Stressmeter</i>	nos.	36			
A19	B.19		Service Water Supply, Sewerage System and Sanitary Installation					
A19.1			<i>Supply and laying of Galvanised Steel Pipes including all accessories, valves and fittings</i>					
A19.1.1		V	<i>- 100 mm nominal dia</i>	m	500			
A19.1.2		V	<i>- 50 mm nominal dia</i>	m	500			
A19.1.3		V	<i>- 25 mm nominal dia</i>	m	500			
A19.2			<i>Supply & installation of pumps for water supply including all electric panels, cables, level switches etc.</i>					
A19.2.1		V	<i>- No. of Operational units</i>	nos.	1			
A19.2.2		V	<i>- No. of Standby units</i>	nos.	1			
A19.3		V	<i>Supply and installation of Water Treatment Plant including two pressure sand/gravel filters (100% capacity each), sodium hypochlorite primary and secondary dosing units, clear water tank, electrical panel and all accessories</i>	L.S.	1			
A19.4			<i>Laying of sewage pipes (spigot & socket buried type with rubber ring sealing / HDPE PN 10 sanitary drainage) including fittings and fixtures</i>					
A19.4.1		V	<i>- 150 mm nominal dia</i>	m	500			
A19.4.2		V	<i>- 100 mm nominal dia</i>	m	500			
A19.5		V	<i>Supply and installation of F.I.B.R. reactor based sewerage treatment plant including collection tank (MS with epoxy coating), grinders, digester tank, aeration tank, settling tank, chlorination units, effluent collection tank, multi-grade filter units, pumps with 100% standby and 100% backup, all pipes, valves, electrical/ mechanical equipment and instrumentation panels</i>	L.S.	1			

Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A20	B.20		Roller Compacted Concrete					
A20.1		VIII	RCC, reference mix including 150 kg of PCC (Portland Composite Cement) cement per cubic meter. Payment for increase or recovery for decrease shall be made at the unit price entered in the Schedule at item A20.3	cum	849,000			
A20.2		VIII	GEVR / GE-RCC	cum	38,200			
A20.3		VIII	PCC Variation	kg	6,800,000			
A20.4		V	Admixture (set retarding water reducing)	kg	641,000			
A20.5		V	Test section for prequalification	L.S.	2			
A20.6			U/S Sprayed Membrane					
A20.6.1		V	- Sprayed epoxy cementitious primer	MT	24			
A20.6.2		V	- Two-component sprayed polyurea membrane below EL. 795.0 m	MT	31			
A20.6.3		V	- Two-component sprayed polyurea membrane above EL. 795.0 m incl. top coat	MT	32			
A20.6.4		V	- External thermo-plastic elastomer at dam contraction joints	m	1,200			
A21	B.21		Additional Investigations					
A21.1			Deformability Tests					
A21.1.1		V	- Plate load test	nos.	15			
A21.1.2		V	- Flat jack test	nos.	10			
A21.1.3		V	- Goodman jack test	nos.	10			
A21.2			Shear Strength Tests					
A21.2.1		V	- Shear Strength test in rock mass	nos.	15			
A21.2.2		V	- Shear Strength test for concrete rock contact	nos.	10			
A21.3			Geophysical Investigations					
A21.3.1		V	- Seismic Refraction Tomography (SRT)	m	4,000			



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A21.3.2		V	- Direct Wave Tomography (DWT)	m	425			
A21.3.3		V	- Cross Hole Tomography (CHT)	m	100			
A21.4			Laboratory tests					
A21.4.1		V	- UCS in Dry and Wet Condition	nos.	75			
A21.4.2		V	- UCS with Measurement of Young's Modulus	nos.	25			
A21.4.3		V	- Determination of Density (Dry & Saturated)	nos.	25			
A21.4.4		V	- Tensile Strength Test	nos.	25			
A21.4.5		V	- Los Angeles Abrasion Test (LAA)	nos.	5			
A21.4.6		V	- Triaxial Test	nos.	25			
A21.4.7		V	- Direct Shear Test	nos.	15			
SUB-TOTAL (PART 1)								
PART 2	HYDRAULIC STEEL STRUCTURE (HSS) EQUIPMENTS							
A22	B.22		HSS Equipment					
A22.1			Design, procurement, fabrication/ manufacturing , inspection, shop assembly, testing, painting and supply including necessary spares					
A22.1.1			Auxiliary Spillway Service Gate					
A22.1.1.1		VI	First stage inserts (anchors with plates), embedded parts, corner angles, etc. for service gate complete in all respects, in accordance with the specifications and drawings.	Set	1			
A22.1.1.2		VI	Second stage embedded parts for service gate complete with wheel track assembly, bumper track, seal seats, seat bases, sill beams, lintel beams, guides, second stage anchor bolts with double nuts and washers etc. complete in all respect in accordance with specifications and drawings.	Set	1			



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A22.1.1.3		VI	Intake service gate including skin plate, vertical stiffeners, horizontal girders including bottom lip, diaphragm, side, top and bottom seal assemblies, end vertical girders, wheel assemblies, all other accessories and appurtenances, complete in all respects in accordance with specifications and drawings.	Set	1			
A22.1.1.4		VI	Hydraulic cylinder, including all hydraulic and electric components, gate position indicator, limit switches, Control panel, power & control cables and wiring, base frame etc. complete in all respect in accordance with the specifications and drawings.	Set	1			
A22.1.1.5		VI	Mandatory Spare parts – As per details given in Particular Technical Specification	Set	1			
A22.1.2			Auxiliary Spillway Stoplogs					
A22.1.2.1		VI	First stage inserts (anchors with plates), embedded parts, corner angles, etc. for stoplogs complete in all respects, in accordance with the specifications and drawings.	Set	1			
A22.1.2.2		VI	Second stage embedded parts complete with wheel track assembly, bumper track, seal seats, seat bases, sill beams, lintel beams, guides, second stage anchor bolts with double nuts and washers etc. complete in all respect in accordance with specifications and drawings.	Set	1			
A22.1.2.3		VI	Stoplogs including skin plate, grab beam, side, top and bottom seal assemblies, end vertical girders, wheel assemblies, all other accessories and appurtenances, complete in all respects in accordance with specifications and drawings.	Set	1			
A22.1.2.4		VI	Mandatory Spare parts – As per details given in Particular Technical Specification	Set	1			
A22.1.3			Spillway Stoplogs					
A22.1.3.1		VI	First stage inserts (anchors with plates), embedded parts, corner angles, etc. for stoplogs complete in all respects, in accordance with the specifications and drawings.	Set	6			



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A22.1.3.2		VI	Second stage embedded parts complete with wheel track assembly, bumper track, seal seats, seat bases, sill beams, lintel beams, guides, second stage anchor bolts with double nuts and washers etc. complete in all respect in accordance with specifications and drawings.	Set	6			
A22.1.3.3		VI	Stoplogs including skin plate, grab beam, side, top and bottom seal assemblies, end vertical girders, wheel assemblies, all other accessories and appurtenances, complete in all respects in accordance with specifications and drawings.	Set	2			
A22.1.3.4		VI	Mandatory Spare parts – As per details given in Particular Technical Specification	Set	1			
A22.1.4			Spillway radial gate					
A22.1.4.1		VI	First stage inserts (anchors with plates), embedded parts, corner angles, etc. for radial gate complete in all respects, in accordance with the specifications and drawings.	Set	6			
A22.1.4.2		VI	Second stage embedded parts for radial gate complete with wheel track assembly, bumper track, seal seats, seat bases, sill beams, lintel beams, guides, second stage anchor bolts with double nuts and washers etc. complete in all respect in accordance with specifications and drawings.	Set	6			
A22.1.4.3		VI	Spillway radial gate including skin plate, vertical stiffeners, horizontal girders including bottom lip, diaphragm, side, top and bottom seal assemblies, end vertical girders, all other accessories and appurtenances, complete in all respects in accordance with specifications and drawings.	Set	6			
A22.1.4.4		VI	Hydraulic cylinder, including all hydraulic and electric components, limit switches, Control panel, power & control cables and wiring, base frame etc. complete in all respect in accordance with the specifications and drawings.	Set	12			
A22.1.4.5		VI	Mandatory Spare parts – As per details given in Particular Technical Specification	Set	1			
A22.1.5			Spillway gantry crane					



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A22.1.5.1		VI	Electrically operated rope drum hoists, including wire ropes, drums, sheaves, gearings, shafts, couplings, bearing, pedestal/plummer blocks, standard gear reducers, electric motor, electromagnetic brakes, gate position indicator, limit switches, Control panel, power & control cables and wiring, base frame etc. complete in all respect in accordance with the specifications and drawings.	Set	1			
A22.1.5.2		VI	Travelling crane structures, foundation anchors, walkways, ladders, hand rails, chequered plate flooring, guard railings, lighting arrangements, associated jointings etc. complete in all respect as per the specifications and drawings.	Set	1			
A22.1.5.3		VI	Mandatory Spare parts – As per details given in Particular Technical Specification	Set	1			
A22.1.6			Spillway Steel Liners					
A22.1.6.1		VI	Steel liner in spillway glacis, including skin plate, stiffeners, anchors, all other accessories and appurtenances, complete in all respects in accordance with specifications and drawings.	Kg	1,748,000			
A22.1.7			Service Gate					
A22.1.7.1		VI	First stage inserts (anchors with plates), embedded parts, corner angles, etc. for service gate complete in all respects, in accordance with the specifications and drawings.	Set	2			
A22.1.7.2		VI	Second stage embedded parts for service gate complete with wheel track assembly, bumper track, seal seats, seat bases, sill beams, lintel beams, guides, second stage anchor bolts with double nuts and washers etc. complete in all respect in accordance with specifications and drawings.	Set	2			
A22.1.7.3		VI	Intake service gate including skin plate, vertical stiffeners, horizontal girders including bottom lip, diaphragm, side, top and bottom seal assemblies, end vertical girders, wheel assemblies, all other accessories and appurtenances, complete in all respects in accordance with specifications and drawings.	Set	2			

Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A22.1.7.4		VI	Hydraulic cylinder, including all hydraulic and electric components, gate position indicator, limit switches, Control panel, power & control cables and wiring, base frame etc. complete in all respect in accordance with the specifications and drawings.	Set	2			
A22.1.7.5		VI	Mandatory Spare parts – As per details given in Particular Technical Specification	Set	1			
A22.1.8			Maintenance Gate					
A22.1.8.1		VI	First stage inserts (anchors with plates), embedded parts, corner angles, etc. for maintenance gate complete in all respects, in accordance with the specifications and drawings.	Set	2			
A22.1.8.2		VI	Second stage embedded parts complete with wheel track assembly, bumper track, seal seats, seat bases, sill beams, lintel beams, guides, second stage anchor bolts with double nuts and washers etc. complete in all respect in accordance with specifications and drawings.	Set	2			
A22.1.8.3		VI	Intake maintenance gate including skin plate, vertical stiffeners, horizontal girders including bottom lip, diaphragm, side, top and bottom seal assemblies, end vertical girders, wheel assemblies, all other accessories and appurtenances, complete in all respects in accordance with specifications and drawings.	Set	2			
A22.1.8.4		VI	Electrically operated rope drum hoists, including wire ropes, drums, sheaves, gearings, shafts, couplings, bearing, pedestal/plummer blocks, standard gear reducers, electric motor, electromagnetic brakes, gate position indicator, limit switches, Control panel, power & control cables and wiring, base frame etc. complete in all respect in accordance with the specifications and drawings.	Set	2			
A22.1.8.5		VI	Hoist supporting structures, foundation anchors, walkways, ladders, hand rails, chequered plate flooring, guard railings, lighting arrangements, associated jointings etc. complete in all respect as per the specifications and drawings.	Set	2			



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A22.1.8.6		VI	Mandatory Spare parts – As per details given in Particular Technical Specification	Set	1			
A22.1.9			Trashrack					
A22.1.9.1		VI	First stage inserts, embedded parts, corner angles, etc. for trashrack complete in all respects, in accordance with the specifications and drawings.	Set	8			
A22.1.9.2		VI	Second stage embedded parts complete with guides, second stage anchor bolts , etc. complete in all respect in accordance with specifications and drawings.	Set	8			
A22.1.9.3		VI	Trashrack panels including all other accessories and appurtenances, complete in all respects in accordance with specifications and drawings.	Set	256			
A22.1.9.4		VI	Mandatory Spare parts – As per details given in Particular Technical Specification	Set	1			
A22.1.10			Trashrack cleaning machine					
A22.1.10.1		VI	Trashrack cleaning machine including dolly and hydraulic grabbing arm, wire ropes, drums, sheaves, gearings, shafts, couplings, bearing, electric motor, Control cabin, power & control cables and wiring, base frame, foundation anchors, walkways, ladders, hand rails, lighting arrangements, associated jointings, etc. complete in all respect in accordance with the specifications and drawings.	Set	1			
A22.1.10.2		VI	Mandatory Spare parts – As per details given in Particular Technical Specification	Set	1			
A22.1.11			Adit Gate					
A22.1.11.1		VI	First stage inserts (anchors with plates), embedded parts, corner angles, etc. for watertight doors complete in all respects, in accordance with the specifications and drawings.	Set	1			
A22.1.11.2		VI	Second stage embedded parts for watertight doors complete with wheel track assembly, bumper track, seal seats, sill beams, lintel beams, guides, second stage anchor bolts with double nuts and washers etc. complete in all respect in accordance with specifications and drawings.	Set	1			

Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A22.1.11.3		VI	Watertight doors for opening size 2.2m X 2.2m including skin plate, vertical stiffeners, horizontal girders including bottom lip, diaphragm, side, top and bottom seal assemblies, end vertical girders, wheel assemblies, all other accessories and appurtenances, complete in all respects in accordance with specifications and drawings.	Set	1			
A22.1.11.4		VI	Mandatory Spare parts – As per details given in Particular Technical Specification	Set	1			
A22.2			Transportation from fabrication shop to site (including insurance)					
A22.2.1		V	- Item A22.1.1.1 above	Set	1			
A22.2.2		V	- Item A22.1.1.2 above	Set	1			
A22.2.3		V	- Item A22.1.1.3 above	Set	1			
A22.2.4		V	- Item A22.1.1.4 above	Set	1			
A22.2.5		V	- Item A22.1.1.5 above	Set	1			
A22.2.6		V	- Item A22.1.2.1 above	Set	1			
A22.2.7		V	- Item A22.1.2.2 above	Set	1			
A22.2.8		V	- Item A22.1.2.3 above	Set	1			
A22.2.9		V	- Item A22.1.2.4 above	Set	1			
A22.2.10		V	- Item A22.1.3.1 above	Set	6			
A22.2.11		V	- Item A22.1.3.2 above	Set	6			
A22.2.12		V	- Item A22.1.3.3 above	Set	2			
A22.2.13		V	- Item A22.1.3.4 above	Set	1			
A22.2.14		V	- Item A22.1.4.1 above	Set	6			
A22.2.15		V	- Item A22.1.4.2 above	Set	6			
A22.2.16		V	- Item A22.1.4.3 above	Set	6			
A22.2.17		V	- Item A22.1.4.4 above	Set	12			
A22.2.18		V	- Item A22.1.4.5 above	Set	1			



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A22.2.19		V	- Item A22.1.5.1 above	Set	1			
A22.2.20		V	- Item A22.1.5.2 above	Set	1			
A22.2.21		V	- Item A22.1.5.3 above	Set	1			
A22.2.22		V	- Item A22.1.6.1 above	kg	1,748,000			
A22.2.23		V	- Item A22.1.7.1 above	Set	2			
A22.2.24		V	- Item A22.1.7.2 above	Set	2			
A22.2.25		V	- Item A22.1.7.3 above	Set	2			
A22.2.26		V	- Item A22.1.7.4 above	Set	2			
A22.2.27		V	- Item A22.1.7.5 above	Set	1			
A22.2.28		V	- Item A22.1.8.1 above	Set	2			
A22.2.29		V	- Item A22.1.8.2 above	Set	2			
A22.2.30		V	- Item A22.1.8.3 above	Set	2			
A22.2.31		V	- Item A22.1.8.4 above	Set	2			
A22.2.32		V	- Item A22.1.8.5 above	Set	2			
A22.2.33		V	- Item A22.1.8.6 above	Set	1			
A22.2.34		V	- Item A22.1.9.1 above	Set	8			
A22.2.35		V	- Item A22.1.9.2 above	Set	8			
A22.2.36		V	- Item A22.1.9.3 above	Set	256			
A22.2.37		V	- Item A22.1.9.4 above	Set	1			
A22.2.38		V	- Item A22.1.10.1 above	Set	1			
A22.2.39		V	- Item A22.1.10.2 above	Set	1			
A22.2.40		V	- Item A22.1.11.1 above	Set	1			
A22.2.41		V	- Item A22.1.11.2 above	Set	1			
A22.2.42		V	- Item A22.1.11.3 above	Set	1			
A22.2.43		V	- Item A22.1.11.4 above	Set	1			



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A22.3			Site assembly, erection/installation, field painting, testing and commissioning of supplied equipment					
A22.3.1		VII	- Item A22.1.1.1 above	Set	1			
A22.3.2		VII	- Item A22.1.1.2 above	Set	1			
A22.3.3		VII	- Item A22.1.1.3 above	Set	1			
A22.3.4		VII	- Item A22.1.1.4 above	Set	1			
A22.3.5		VII	- Item A22.1.2.1 above	Set	1			
A22.3.6		VII	- Item A22.1.2.2 above	Set	1			
A22.3.7		VII	- Item A22.1.2.3 above	Set	1			
A22.3.8		VII	- Item A22.1.3.1 above	Set	6			
A22.3.9		VII	- Item A22.1.3.2 above	Set	6			
A22.3.10		VII	- Item A22.1.3.3 above	Set	2			
A22.3.11		VII	- Item A22.1.4.1 above	Set	6			
A22.3.12		VII	- Item A22.1.4.2 above	Set	6			
A22.3.13		VII	- Item A22.1.4.3 above	Set	6			
A22.3.14		VII	- Item A22.1.4.4 above	Set	12			
A22.3.15		VII	- Item A22.1.5.1 above	Set	1			
A22.3.16		VII	- Item A22.1.5.2 above	Set	1			
A22.3.17		VII	- Item A22.1.6.1 above	kg	1,748,000			
A22.3.18		VII	- Item A22.1.7.1 above	Set	2			
A22.3.19		VII	- Item A22.1.7.2 above	Set	2			
A22.3.20		VII	- Item A22.1.7.3 above	Set	2			
A22.3.21		VII	- Item A22.1.7.4 above	Set	2			
A22.3.22		VII	- Item A22.1.8.1 above	Set	2			
A22.3.23		VII	- Item A22.1.8.2 above	Set	2			
A22.3.24		VII	- Item A22.1.8.3 above	Set	2			



Item No.	Ref. to TS	Price Adjustment Category Ref.	Description	Unit	Quantity	Rate (Nu./ Rs.)		Amount (Nu./Rs.)
						In Figures	In Words	
A22.3.25		VII	- Item A22.1.8.4 above	Set	2			
A22.3.26		VII	- Item A22.1.8.5 above	Set	2			
A22.3.27		VII	- Item A22.1.9.1 above	Set	8			
A22.3.28		VII	- Item A22.1.9.2 above	Set	8			
A22.3.29		VII	- Item A22.1.9.3 above	Set	256			
A22.3.30		VII	- Item A22.1.10.1 above	Set	1			
A22.3.31		VII	- Item A22.11.1 above	Set	1			
A22.3.32		VII	- Item A22.11.2 above	Set	1			
A22.3.33		VII	- Item A22.11.3 above	Set	1			
A22.4		VI	E-Flow Release System	LS	1			
A23	B.23		Road Works					
A23.1		V	- Repair and Maintenance of Access Road	km-month	280			
A24	B.24		Electrical and Mechanical Equipment					
A24.1		V	Lighting systems	L.S.	1			
A24.2		V	Elevator for Dam	L.S.	1			
A24.3		V	Grounding system	L.S.	1			
A24.4		V	Drainage water pumping system	L.S.	1			
SUB-TOTAL (PART 2)								
GRAND TOTAL (PART 1 + PART 2)								
IN FIGURES Nu./Rs.								
IN WORDS:								

